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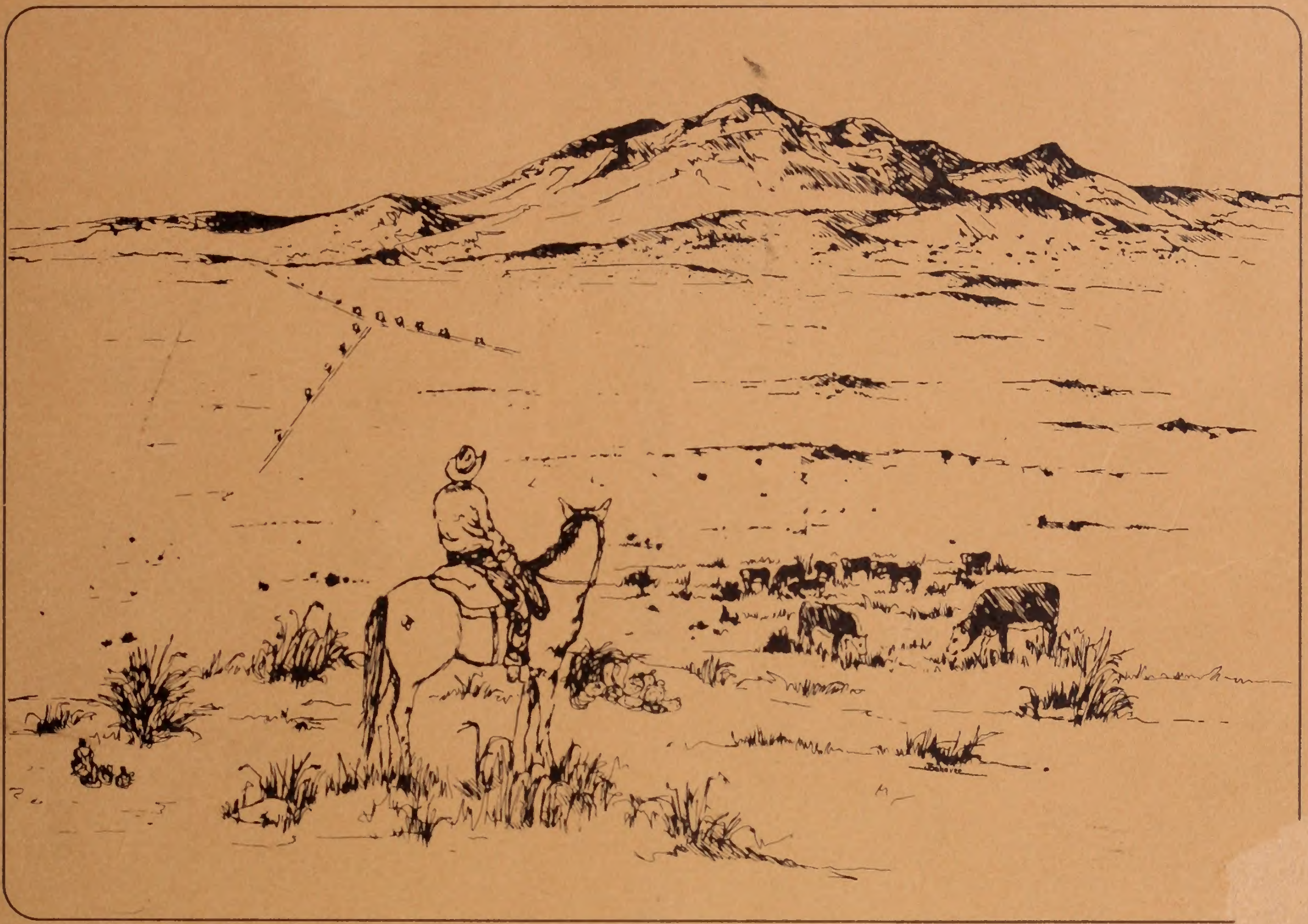

WEST SOCORRO
Rangeland Management Program

U. S. Department of the Interior
Bureau of Land Management
Socorro District Office
San Augustine Resource Area

May 1982

United States Department of the Interior

BUREAU OF LAND MANAGEMENT

District Office
P. O. Box 1219
Socorro, New Mexico 87801

IN REPLY REFER TO
1792
West Socorro EIS

Enclosed for your review and comment is the Draft Environmental Impact Statement (EIS) for the West Socorro Rangeland Management Program. This statement was prepared pursuant to Section 102(2) of the National Environmental Policy Act of 1969. It was prepared from information garnered by the Bureau of Land Management and other sources including Federal, State, and local agencies, interested private organizations, and citizens.

This EIS describes a Preferred Alternative and analyzes the environmental, social, and economic effects of implementing this proposal within the Divide Planning Area. The document also describes three alternatives to the Preferred Alternative and analyzes the effects associated with implementing each alternative.

Public hearings are scheduled for June 8, 1982, at the Grants State Bank Community Room, 824 West Santa Fe Avenue, Grants, New Mexico and June 9, 1982, at the Community Hall at the rodeo grounds in Datil, New Mexico. Both hearing sessions will begin at 7 p.m. The purpose of these hearings is to receive verbal and written testimony on the contents of this EIS. Persons that desire to testify at either of the above hearings are asked to submit the registration form in the map pocket at the back of this EIS by June 4, 1982.

Please retain this Draft EIS for possible use in conjunction with the Final EIS. Council on Environmental Quality regulations [43 CFR 1503.4(c)] provide for circulation of abbreviated Final EIS's where major changes to the Draft are not required. If public review requires only minor changes to this Draft, then the Final EIS will be a supplement containing public comment, our response to those comments, and necessary changes and corrections. This procedure will reduce printing costs and expedite the environmental process.

We would appreciate receiving your written comment, as well as verbal testimony, regarding this EIS. The comment period will extend from the date the Draft EIS is filed with the Environmental Protection Agency through July 9, 1982. Written comment and public hearing forms should be sent to Glenn Sekavec, EIS Staff Leader, at the above address.

Sincerely yours,

Paul W. Tanner
Area Manager
San Augustine Resource Area

Enclosure

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ENVIRONMENTAL IMPACT STATEMENT

for the

PROPOSED WEST SOCORRO RANGELAND MANAGEMENT PROGRAM

Catron, Cibola, Socorro and Valencia Counties, New Mexico

U. S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
SOCORRO DISTRICT OFFICE
SAN AUGUSTINE RESOURCE AREA

Charles W. Luscher

Charles W. Luscher
State Director, New Mexico

Abstract: The Bureau of Land Management, Socorro District Office, proposes to implement a rangeland management program for the Divide Planning Area located in Catron, Cibola, Valencia, and Socorro Counties in west-central New Mexico. This rangeland management program would implement specific management actions on 187 grazing allotments within six management categories. This program is designed to improve and maintain rangeland condition on 986,092 acres of public land in order to enhance vegetative resources. This program would also provide a sustained yield of livestock forage, quality habitat for wildlife, reduce soil erosion and improve water quality. Three alternatives - No Action, Elimination of Livestock Grazing, and Maximization of Livestock Forage Production are analyzed in conjunction with the Preferred Alternative. A discussion of the affected environment is included, and the environmental consequences which would result from implementation of the Preferred Alternative and other alternatives are analyzed in this Environmental Impact Statement.

For Further Information Contact: Glenn Sekavec, EIS Staff Leader, BLM, Socorro District Office, P.O. Box 1219, Socorro, New Mexico 87801 or Call (505) 835-0412.

Type of Action: (X) Administrative ( ) Legislative

Comments have been requested from: See Chapter IV

Date Filed with EPA APR 26 1982

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Comments on this EIS are due by:

JUL 9 1982

Special thanks to Judith R. Sekavec, who illustrated the front cover, and to many Resource Specialists of the Bureau of Land Management, New Mexico State Office who assisted in the development and review of this EIS.

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SUMMARY

Introduction

The Bureau of Land Management (BLM), Socorro District Office, proposes to implement a rangeland management program on 986,092 acres of public land administered by BLM within the Divide Planning Area (DPA) of the San Augustine Resource Area. A Preferred Alternative and three other alternatives have been developed to improve rangeland management in the DPA. The purpose of the Preferred Alternative is to protect and enhance the soil and vegetative resources of the DPA which provide the foundation for livestock forage, watershed, wildlife habitat, recreation and aesthetics, and commensurate social and economic values.

Description of the Alternatives Including the Preferred Alternative

Alternative 1 (Preferred Alternative)

The Preferred Alternative was formulated in conjunction with development of the BLM DPA multiple land-use plan. All 187 grazing allotments within the DPA were evaluated and assigned an average allotment range condition. Each allotment was then placed within one of six management categories depending on range condition and acreage of public land within the allotment. Each of the six management categories possesses inherent management actions based on livestock grazing/management principles. These include season-of-use, distribution of domestic livestock, kind and class of livestock, and numbers of livestock. Each of these management actions has been listed in a priority sequence within each management category. Some management actions would be required during implementation and others would be optional.

Based on the management category in which an allotment has been placed, the BLM Socorro District would implement, at a minimum, those required management actions and possibly optional management actions on all 187 grazing allotments within the DPA. Implementation of management actions by allotment management category would be conducted in conjunction with "careful and considered consultation, cooperation and coordination with the lessees, permittees, and landowners involved..." as required by Section 8 of the Public Rangelands Improvement Act.

In addition, construction of rangeland improvements and vegetative land treatments would be required to implement Alternative 1. These would include, at a minimum, the construction of 47 miles of fence, 65 miles of pipeline, 10 wells, and 27 pit tanks. Vegetative land treatments would be conducted on an estimated maximum 353,320 acres of public land within the DPA. These treatments include mechanical work, herbicide application, and prescribed burning to control pinyon-juniper and rabbitbrush encroachment on a maximum of 299,560 acres; pitting, contour ripping, and contour furrowing on 17,280 acres; and seeding or interseeding 36,480 acres of BLM administered public land within the DPA.

Monitoring of the Preferred Alternative would be conducted to determine the effectiveness of implementing management actions by management category, rangeland improvements and vegetative land treatments. Wildlife habitat monitoring studies would also be simultaneously conducted either annually or biannually to determine wildlife habitat condition, trend, utilization of various habitats and distribution and movement of certain wildlife species.

Alternative 2 (No Action)

Alternative 2 would be the continuation of the current BLM Socorro District rangeland management program. The existing 13 allotments within the DPA with developed Allotment Management Plans (AMPs) and the one Experimental Stewardship Plan (ESP) would continue operation with revisions made, if necessary, based on the results of the monitoring studies. The remaining 173 allotments within the DPA would not be intensively managed. Existing rangeland improvements would be maintained; however, BLM would not construct any new projects except on allotments with existing AMPs or the ESP. Wildlife, watershed, and other resource use improvements would continue to be constructed under current procedures. Livestock operator-built rangeland improvements would be processed under permits as at present.

Alternative 3 (Elimination of Livestock Grazing)

In Alternative 3, all domestic livestock grazing on 986,092 acres of public land administered by BLM within the DPA would be discontinued. No grazing authorizations would be issued and no AMPs would be developed. To ensure that domestic livestock were not grazed on public lands, an estimated 2,554 miles of fence would need to be constructed by the private landowner or State land lessee. The range management program within the DPA would be limited to trespass detection and the processing of trespass cases. No new rangeland improvements would be constructed, and those existing improvements would be maintained by BLM only if required for other resource uses (such as wildlife) and would otherwise be removed.

Alternative 4 (Maximization of Livestock Forage Production)

In Alternative 4, intensive management would be provided on all allotments within the DPA. AMPs would be developed on those 173 allotments currently without such.

In addition to total allotment management, vegetative land treatments would be conducted on an estimated maximum of 545,815 acres of public land. These treatments include controlling pinyon-juniper on 58,238 acres of public land, discing and interseeding 56,159 acres, pitting, ripping, and furrowing 26,746 acres, controlled burning of 363,335 acres, and chemically treating 41,337 acres of public land. Rangeland improvements would be constructed; however, the type, number, and location of these projects are unknown at this time. Project types would be developed simultaneously with the development of AMPs. Rangeland and wildlife habitat monitoring studies would also be conducted to continually assess the effects of total intensive management, vegetative land treatments, and rangeland improvements.

Environmental Consequences of the Alternatives Including the Preferred Alternative

Site-specific Environmental Assessments (EAs) and those Standard Operating Procedures described in Chapter I would mitigate the impacts on Cultural Resources (Alternatives 1, 2, and 4) and Visual Resources. No actions would be taken that would impair wilderness values in designated Wilderness Study Areas. Therefore, these resources are not discussed in detail in this section.

For analysis purposes in this Environmental Impact Statement (EIS), short-term impacts are defined as those impacts to the environment that would occur, as the result of implementing any of the alternatives under consideration, through the year 1989. Long-term impacts are those impacts that would occur through the year 2000. Table S-1 illustrates the comparison of impacts of the Preferred Alternative and other alternatives under consideration.

Alternative 1 (Preferred Alternative)

In Alternative 1 there would be minimal, localized, short-duration impacts on air quality in the form of smoke generation and fugitive dust.

Sediment yields would be reduced approximately 8 percent in the long term, but would increase slightly in the short term on areas receiving vegetative land treatments. In the short term, wind erosion would increase slightly in areas where vegetation is removed or disturbed; however, in the long term, wind erosion would decrease as vegetation is reestablished.

Water runoff would decrease 7 to 23 percent depending upon ground cover, slope, soil type and vegetative type within each watershed. Minor, temporary runoff increases would result from the construction of rangeland improvements but would end with the reestablishment of permanent vegetative ground cover. Water consumption by livestock and big game would increase 21 percent by the year 2000.

In the short term as well as the long term, there would be increases in cover and production of desirable and intermediate forage species.

The diversity of small mammals and summer birds would vary according to the Standard Habitat Site (SHS). Generally speaking, the diversity of small mammals would decrease while the diversity of summer birds would increase.

Deer and antelope numbers would increase from 2,200 and 600 to 4,500 and 1,600, respectively. Wintering elk numbers would increase to 100 animals in the long term.

Federally listed endangered species would not be affected by the Preferred Alternative. Baird's sparrow (State Listed: Endangered, Group II) would benefit through the increased availability of grass seed.

TABLE S-I

COMPARISON OF IMPACTS OF THE ALTERNATIVES

Resource	Existing	Preferred Alternative		No Action Alternative		Elimination of Grzg.		Maximization Lvstck. Forage Prod.	
		Short Term	Long Term	Short Term	Long Term	Short Term	Long Term	Short Term	Long Term
Physical Setting	Stable	NS	NS	NS	NS	NS	NS	NS	NS
Vegetation									
Pounds of Air Dry Matter in Current Years Production (Millions of Pounds)	253.8	309.6	403.2	257.0	261.0	340.2	486.0	340.2	486.0
Ecological Condition Class (Acres)1/									
Excellent	1,892	33,669	86,664	4,991	9,905	34,519	91,519	65,293	168,123
Good	441,436	468,756	493,847	441,557	449,252	494,860	541,627	464,086	465,152
Fair	446,859	390,462	315,070	440,947	431,801	363,507	262,306	363,507	262,306
Poor	8,948	6,249	3,554	8,639	8,176	6,249	3,554	6,249	3,554
Soils									
Percent Change in Sediment Yield	<0.2 Ac. Ft./mi²/ Yr. class2/ (Stable)	+3	-8	0	0	0	-11	+4	-5
Wildlife (Numbers)									
Deer	2,200	2,200	4,500	2,200	2,200	2,200	4,500	2,200	4,500
Antelope	600	600	1,600	600	600	600	1,600	600	1,600
Elk	5	5	100	5	5	5	100	5	100
Wildlife AUMs	3,759	4,758	9,949	4,758	4,758	3/	3/	4,758	9,949
Estimated Overall Change in Standard Habitat Sites	E	NS+	NQ+	NC	NC	NQ+	NQ+	NQ+	NQ+
Livestock Grazing/Mgmt.									
No. of Livestock Operators	156	156	156	156	156	0	0	156	156
Domestic Livestock Forage Allocation (AUMs)	141,600	157,000	178,200	143,000	145,000	0	0	186,000	250,000
Water Resources									
Water Use (Ac. ft./Yr.)	2,369	2,890	3,764	2,400	2,436	0	0	3,176	4,537
Decrease in Runoff (%)	NC	NC	21	NC	NC	NC	19	NC	13

TABLE S-I (continued)

COMPARISON OF IMPACTS OF THE ALTERNATIVES

Resource	Existing	Preferred Alternative Short Term	Preferred Alternative Long Term	No Action Alternative Short Term	No Action Alternative Long Term	Elimination of Grzg. Short Term	Elimination of Grzg. Long Term	Maximization Lvstck. Forage Prod. Short Term	Maximization Lvstck. Forage Prod. Long Term
Air Quality	Stable	Local Dust Increase	NC	NC	NC	Dust Decrease	Dust Decrease	Local Dust Increase	NC
Cultural Resources	NK	NQ	NQ	NQ	NQ	+	+	NQ	NQ
Visual Resources	Stable	NS-	NS+	NC	NC	NS+	NS+	NS-	NS
Wilderness	Stable	NS-	NS-	NS-	NS-	NS+	NS+	NS-	NS-
Recreation									
Deer Hunting (Visitor Days)	4,164	4,180	8,550	4,180	4,180	4,180	8,550	4,180	8,550
Social Conditions	*	*	*	*	*	*	*	*	*
Economic Conditions ($)									
Livestock Sales	8,637,870	8,800,348	9,023,464	8,652,813	8,673,717	7,169,432	7,169,432	9,103,710	9,768,567
Cash Costs	3,373,272	3,436,723	3,523,854	3,379,107	3,387,271	2,799,815	2,799,815	3,555,192	3,814,833
Net Cash Sales	5,264,598	5,363,625	5,499,610	5,273,706	5,286,446	4,369,617	4,369,617	5,548,518	5,953,734
Depreciation	1,007,274	1,026,220	1,052,238	1,009,016	1,011,454	836,037	836,037	1,061,596	1,139,126
SUBTOTAL NET INCOME -	4,257,324	4,337,405	4,447,372	4,264,690	4,274,992	3,533,580	3,533,580	4,486,922	4,814,608
Other Costs	3,561,918	3,628,917	3,720,922	3,568,080	3,576,699	2,956,391	2,956,391	3,754,012	4,028,173
TOTAL NET INCOME -	695,406	708,488	726,450	696,610	698,293	577,189	577,189	732,910	786,435
Mule Deer Visitor Day Direct Income Value	313,549	314,754	1,037,799	314,754	504,368	314,754	1,037,799	314,754	1,037,799

1/ Resultant from implementing management actions (does not include vegetative land treatments).

2/ The existing weighted average value for sediment yield is actually borderline to the slight class (0.2 - 0.5 acre-feet per square mile per year).

3/ All forage available for wildlife.

NK Not Known
NQ Non-Quantifiable
NS Not Significant
NC No Change from Existing (Changes Not Quantifiable)
E Existing Value
I Increased Value
+ Beneficial
- Adverse
* See Table III-7 for Assessment of Social Change by Alternative.

Short-term/Long-term (see Glossary or Chapter III for definition).

Source: BLM Socorro District Planning/EIS Files.

Anticipated domestic livestock forage allocation would increase from the current level of 141,600 AUMs to 178,200 AUMs by the year 2000; this would meet the anticipated demand for AUMs produced on public land. The Preferred Alternative would increase big game allocation from the current required level of 4,758 to 9,949 AUMs by the year 2000. This increase in AUMs would provide all forage necessary to sustain big game numbers within the DPA.

Some damage to cultural resources would continue because of livestock trampling, but site-specificity difficulties inherent in assessing damage to archaeological resources preclude exact evaluation of losses. Impacts to known resources or resources discovered during resource clearances of rangeland improvements or vegetative land treatments would be mitigated or prevented prior to conducting such projects on a site-specific basis.

As vegetative cover increases on rangelands, visual quality and variety would improve.

With the improvement of wildlife habitat, hunting would improve. Increases in regional population would be expected to create additional deer hunting pressure. Deer hunting visitor days would increase from the current level of 4,164 to approximately 8,550 by the year 2000.

The existing social environment and the quality of life conditions would be maintained and, in the long term, would gradually be improved. This alternative would ensure continuance of ranching as a life-style, the stability of the family institution, and the community structure would be enhanced. As management actions were taken, the aesthetic values of the environment would be increased through improved range conditions and maintenance of wildlife habitat; the recreational opportunities would be increased as the result.

Livestock operators' personal income would increase under the Preferred Alternative. Their ability to borrow money using their authorized grazing use on Federal lands as collateral would also increase.

Alternative 2 (No Action)

Air quality impacts, consisting of smoke and fugitive dust generation, would be minimal, localized, and of short duration.

Sediment yields and wind erosion susceptibility would not measurably change from present existing conditions.

There would be little or no change in vegetative cover or in production of all plant species.

Small mammal and summer bird diversity would remain stable within the DPA. Big game populations would remain stable but at a level far below optimum numbers. Very little change from current condition would occur to wildlife habitat (Table III-5).

In the No Action Alternative, domestic livestock forage allocation would increase at an estimated constant rate of 200 AUMs per year from the current level of 141,600 AUMs to 145,000 AUMs by the year 2000. Forage allocation to wildlife would remain constant at the current level of 4,758 AUMs throughout the year 2000. Federal grazing preference would remain at 153,406 AUMs. Fourteen allotments would continue to be intensively managed under AMPs and an ESP while the remaining 173 allotments would not be intensively managed.

Some minor damage to cultural resources, because of livestock trampling, would continue at the present rate.

Deer hunting visitor days would remain near the present level of 4,164.

The social environment and the quality of life conditions would change very little. The life-styles, the family institution, and the community structure would remain much the same.

Management actions for the increase of wildlife would be conducted solely in conjunction with the wildlife program. The opportunities for recreational experience, aesthetic viewing and existence values would not change, but demand would continue to increase in proportion to population growth.

Established economic trends would continue in Alternative 2. Any changes that would occur would not be due to factors related to Alternative 2.

Alternative 3 (Elimination of Livestock Grazing)

Smoke and fugitive dust would have minimal, short-duration impacts on localized portions of the DPA.

There would be an 11-percent decrease in sediment yield in the long term. Wind erosion susceptibility would also decrease in the long term. In the short term, there would not be any significant change in sediment yield or wind erosion susceptibility.

Water runoff would be decreased as much as 19 percent depending upon cover, slope, etc. Consumptive use of water by livestock would cease, making an additional 2,379 acre-feet of water available on public lands for other uses.

Vigor and production of rangeland forage plants would improve.

There would be no competition between livestock and wildlife for forage. Small mammal and summer bird diversities would tend toward those present in a climax vegetative community. Big game numbers would reach optimum numbers faster than under Alternative 1. Eliminating livestock grazing would allow grasses to seed out which would in turn benefit the State Endangered (Group II) Baird's sparrow.

All of the 141,600 AUMs presently allocated to livestock use would no longer be available for that purpose. However, all forage allocation would be reserved for other resource uses. All existing rangeland improvements not used for wildlife or other purposes would be removed.

Damage to cultural resources due to livestock trampling would cease. Ongoing historical development as well as the major life-style of the DPA would be, in part, destroyed.

With increases in vegetative cover and production, visual variety, and therefore quality, would also improve.

Alternative 3 would not significantly increase non-hunting recreational opportunities; however, removal of rangeland improvements, that serve no other purpose, and cattle would eliminate existing and potential conflicts between recreational users and livestock operators. Cross-country vehicular access would improve with the removal of fences. This improved cross-country access would be offset, by reduced levels of maintenance on the existing ranch access roads. This would reduce access for all recreational activities. Deer hunting visitor days would increase to approximately 8,550, an increase of 4,386 visitor days over the current level of use.

The social environment and the quality of life would undergo major changes with the elimination of livestock grazing. Sixty-two percent of the livestock operators would have to cease their operations and find employment elsewhere. Most of them would have to compete for jobs in an area already characterized by a higher than State average unemployment rate. Some villages and towns would experience additional demands on an already strained infrastructure.

Income loss would lessen the quality of life of livestock operators as well as businessmen of the area. The DPA is already below the State average in amount of per capita income and median family income.

The stability of the family and community would be altered through spatial movement, uncertainty and anxiety, and changes in the patterns of social interaction.

There would be additional demands upon the infrastructure with the need of additional police, increased public social services and increased urban school population.

Elimination of livestock grazing would have adverse economic effects. Net revenues to all livestock operators using public land would decrease. Livestock operators would be forced to sell their livestock or supplemental feed or graze on private or State lands. Their continued operation would depend upon their prior level of dependency on public lands for grazing and their ability to meet all cash costs after individual adjustments in levels of grazing.

Alternative 4 (Maximization of Livestock Forage Production)

In Alternative 4, there would be minimal, localized, short-duration impacts on the air quality in the form of smoke generation and fugitive dust.

Sediment yields would be reduced approximately 5 percent in the long term. In the short term, there would be an approximate 4-percent increase in sediment yield. Wind erosion susceptibility would increase slightly in the short term in areas where the vegetation is temporarily removed or disturbed. In the long term, as vegetation is reestablished, wind erosion susceptibility would decrease.

Water runoff would decrease 10 to 16 percent depending on cover, etc. Water consumption by livestock and big game would increase 44 percent in the long term.

In the short and long terms, there would be increases in cover and production of desirable and intermediate forage species.

Within the DPA, small mammal diversity would decrease and summer bird diversity would increase. Deer, antelope and elk numbers would increase to 4,500, 1,600, and 100, respectively. Baird's sparrow would benefit from Alternative 4.

AMPs would be developed on 173 allotments and implemented on all allotments. Vegetative land treatments would be performed on an estimated maximum 545,815 acres. Anticipated domestic livestock forage allocation would increase from the current level of 141,600 AUMs to the full DPA potential of 250,000 AUMs by the year 2000. Initial and future forage allocations to big game populations would be 4,758 AUMs and 9,949 AUMs, respectively. This big game allocation would be adequate to sustain those numbers of animals capable of being produced within the DPA.

Damages to cultural resources would continue because of livestock trampling, but difficulties inherent in assessing potential site-specific damage to archaeological resources preclude exact evaluation of losses.

An increase in the number of rangeland improvements, vegetative land treatments, and resulting domestic livestock would increase the potential conflicts between recreational users and livestock operators. Rangeland improvements and vegetative land treatments located near existing and proposed recreation sites would further increase these potential conflicts which would be greatest along the proposed route of the Continental Divide National Scenic Trail (the final trail location is unknown at this time).

It is expected that off-road vehicle (ORV) use of areas subject to vegetative land treatment would be restricted while the new vegetation responds, temporarily reducing overall ORV opportunities and reducing recreational access to affected areas. Recreational access would also be restricted by the construction of new fences.

Deer hunting visitor days would increase to approximately 8,550. This represents an increase of 4,386 over the current use level.

The social environment would change very little except for a small increase in population. The quality of life would be enhanced by an increase in income which would provide the opportunity for greater accessibility to goods and services, a decrease in the demand for public services, and a lower unemployment rate. The life-styles of the livestock operators would continue as would the stability of the family and the community structure. Existing patterns of social interaction would continue.

The increased grazing capacities resulting from Alternative 4 would increase the income of the livestock operators and add to the overall well-being of the general economy of the DPA.

CHAPTER I

ALTERNATIVES INCLUDING THE PREFERRED ALTERNATIVE

PURPOSE AND NEED

The Bureau of Land Management (BLM) Socorro District proposes to implement a rangeland management program (see Glossary) on 187 grazing allotments located within the Divide Planning Area (DPA) in west-central New Mexico (see Visual A in map pocket at back of document for DPA location, surface ownership, and allotments). The DPA is the western portion of the area administered by BLM Socorro District. The programs analyzed within this Environmental Impact Statement (EIS) include Alternative 1 (the Preferred Alternative), Alternative 2 (No Action), Alternative 3 (Elimination of Livestock Grazing), and Alternative 4 (Maximization of Livestock Forage Production).

The DPA (Map I-1) includes all public land administered by BLM in Catron and Cibola Counties, a small portion of the extreme eastern part of Valencia County, and a portion of west-central and southwestern Socorro County. The DPA was geographically established to include the old BLM planning units of Quemado, Driveway, and Malpais. The DPA contains 6,039,519 surface acres; Table I-1 illustrates land ownership. The DPA contains 899,135 acres of range condition rated public land, 13,671 acres of unallotted public land, and 73,286 acres of non-range site. There are an additional 2,077,666 Federal subsurface acres (minerals) in the DPA administered by BLM Socorro District.

This EIS responds to requirements of the National Environmental Policy Act (NEPA) of 1969 to analyze the impacts of projects that significantly affect the quality of the human environment and to the Federal Land Policy and Management Act's (FLPMA) (1976) mandate to provide for the orderly use and development of public rangelands and to conserve the land and its resources. The overall objective of the rangeland management program is to improve the productivity of rangelands and to fulfill social, economic, and environmental needs within the DPA.

DEVELOPMENT OF THE PREFERRED ALTERNATIVE AND OTHER ALTERNATIVES

The proposed range management program (Preferred Alternative) was formulated in conjunction with the development of the DPA multiple land-use plan. Appendix E describes the overall planning process and identifies the steps that have been and will be taken by BLM managers in making range management decisions for the DPA.

PURPOSE OF THE PREFERRED ALTERNATIVE

The purpose of Alternative 1 (Preferred Alternative) is to protect and enhance the soil and vegetative resources of the DPA. These resources provide the foundation for livestock forage, watershed, wildlife habitat, recreation and aesthetics, and commensurate social and economic values.

LONG-TERM OBJECTIVES

Through implementation of management actions, rangeland improvements, vegetative land treatments, or combinations thereof, the Preferred Alternative has been designed to accomplish the following objectives by the year 2000:

Table I-1

LAND OWNERSHIP OF THE DIVIDE PLANNING AREA

	Acres	Percent
Public Land Administered by the BLM Socorro District Office	986,092	16.33
Private	3,011,518	49.86
State	807,548	13.37
Withdrawn*	1,234,361	20.44
TOTAL	6,039,519	100.00

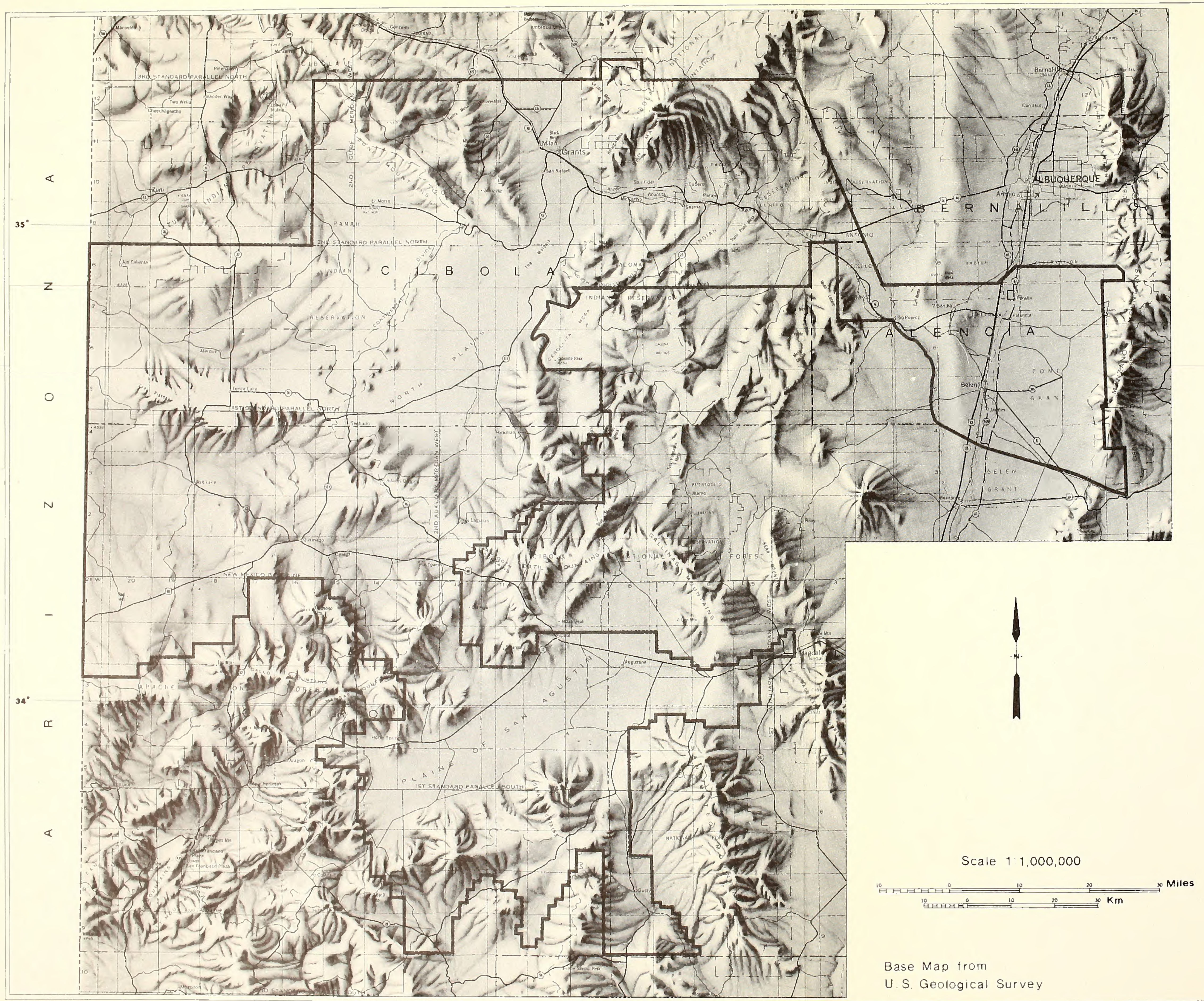
Source: BLM Socorro District Planning/EIS Files

* Lands withdrawn by the Federal Government or non-Federal entities for purposes such as Indian reservations, national forests, administrative sites, etc.

U. S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
SOCORRO DISTRICT OFFICE
SAN AUGUSTINE RESOURCE AREA

WEST SOCORRO
RANGELAND MANAGEMENT PROGRAM
ENVIRONMENTAL IMPACT STATEMENT

MAP I-1. The Study Area



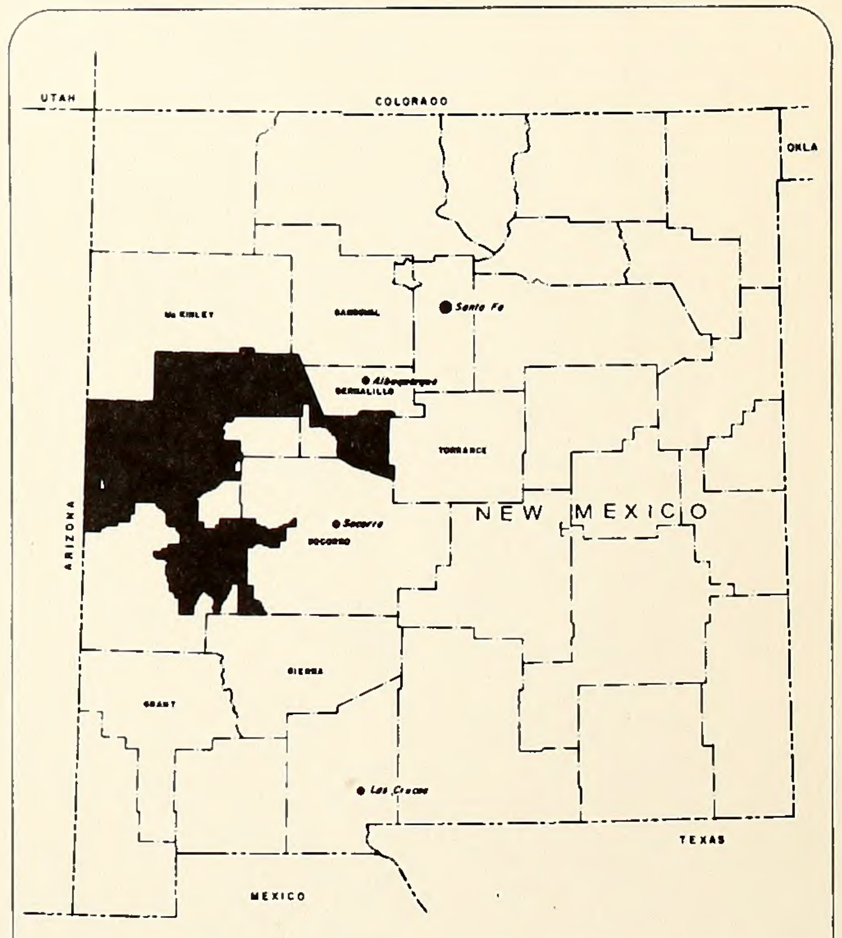
Scale 1:1,000,000

Miles

Km

Base Map from
U.S. Geological Survey

Divide Planning Area Boundary



Source: BLM Socorro District Planning/EIS Files

1) Increase estimated available livestock forage allocation from the amount of 141,600 Animal Unit Months (AUMs) to meet an anticipated demand of 178,200 AUMs;

2) Decrease 8,948 acres of existing poor range condition rated public land to 3,554 acres, decrease 446,859 acres of existing fair range condition rated public land to 315,070 acres, increase 441,436 acres of existing good range condition rated public land to 493,847 acres, and increase 1,892 acres of existing excellent range condition rated public land to 86,664 acres (management actions only);

3) Improve 233,978 acres of mule deer habitat located in the Sand Canyon, Cebolla Canyon, Horse Mountain, Pelona Mountain, and Dusty areas to support a mule deer population increase from the existing 2,200 animals to 4,500 animals;

4) Improve 336,000 acres of pronghorn antelope habitat located in the San Augustine Plains, El Malpais, Red Hill, and Adobe Ranch areas to support a pronghorn antelope population increase from the existing 600 animals to 1,600 animals;

5) Improve 13,500 acres of public land in the Pelona Mountain area to support a wintering population of 100 elk;

6) Improve and maintain 2,495 acres of wetland and other riparian habitat to provide nesting, resting, and feeding area for waterfowl, shorebirds, and other wetland-riparian dependent wildlife species;

7) Manage habitat utilized by State and Federally listed threatened, endangered, or sensitive plant or animal species residing on or migrating over public lands within the DPA; and

8) Reduce runoff and soil erosion on all public land, within the DPA, by managing rangeland resources and allocating vegetation in such a manner as to provide for watershed protection needs.

DESCRIPTION OF THE ALTERNATIVES INCLUDING THE PREFERRED ALTERNATIVE

Alternative 1 (Preferred Alternative)

BLM proposes to implement a range management program designed to provide effective management on those allotments where it is needed most to maintain, improve, and monitor range conditions in the DPA.

The BLM Socorro District has placed the allotments in the DPA into six management categories (Table I-2) based upon present range condition, acres of public land within the allotment, and current management; e.g., Allotment Management Plans (AMP) or the Experimental Stewardship Plan (ESP). Using the fundamental principles of range management, management actions (Table I-2) of varying applicability and sequence of priority were assigned to each management category. These management actions are listed as either "required" or "optional."

TABLE I-2

ALLOTMENT MANAGEMENT CATEGORIES
AND MANAGEMENT ACTIONS WITHIN EACH MANAGEMENT CATEGORY

Management Category A - Allotment average condition - poor; greater than 640 acres public land.

1. Adjust Numbers of Livestock. (Required Action)
2. Season-of-Use Management - For each pasture a minimum 12-month continuous rest is required within the 48-month period following the effective date of the final decision, to begin no later than 24 months following the same date. Rangeland improvements required to implement. (Required Action)
3. Distribution Management - Rangeland improvements, initiate supplement/salting recommendation. (Optional Action)
4. Change in Class or Kind of Livestock. (Optional Action)

Management Category B - Allotment average condition - fair; greater than 640 acres public land.

1. Season-of-Use Management - A minimum of one spring (4/1-6/30) one summer (7/1-9/30)*, and one fall (10/1-11/30)* rest with the 48-month period following the final decision, for each pasture. Rangeland improvements required to implement. (Required Action)
2. Distribution Management - Rangeland improvements, initiate supplement/salting recommendation. (Required Action)
3. Adjust Numbers of Livestock. (Optional Action)
4. Change in Class or Kind of Livestock (Optional Action)

Management Category C - Allotment average condition - poor; less than 640 acres public land.

1. Season-of-Use Management - A minimum of one spring (4/1-6/30)*, one summer (7/1-9/30)* and one fall (10/1-11/30)* rest with the 48-month period following the effective date of the final decisions, for each pasture. Rangeland improvements required to implement. (Required Action)
2. Distribution Management - Rangeland improvements, initiate supplement/salting recommendation. (Optional Action)
3. Adjust Numbers of Livestock. (Optional Action)
4. Change in Class or Kind of Livestock. (Optional Action)
5. Exclusion of Public Lands from State and Private Lands. (Optional Action)

Management Category D - Allotment average condition - good/excellent and having some public lands in poor condition; average fair condition allotments, public lands less than 640 acres, having some public lands in poor condition.

1. Distribution Management - Rangeland improvements, all pastures to improve condition; initiate supplement/salting recommendation (public land) on pastures having any public lands in poor condition. (Required Action)
2. Season-of-Use Management - For pastures having any public lands in poor condition, recommend one spring (4/1-6/30)*, one summer (7/1-9/30)* and one fall (10/1-11/30)* rest with the 48-month period following the effective date of the final decision. No recommendations for other pastures. (Required Action)

Management Category E - Under intensive management (AMPs, Stewardship).

1. Evaluate Studies. (Required Action)
2. Management Changes Based on Studies. (Required Action)
    a. Season of Use
    b. Distribution Management - rangeland improvements
    c. Adjust Numbers of Livestock

Management Category F - Allotment Average condition - good/excellent, having no public lands in poor condition. Average fair condition, public lands less than 640 acres; no public lands in poor condition.

1. Rangeland Improvements to Improve Range Condition. (Optional)

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* Plus or minus 15-day flexibility.

Source: BLM Socorro District Planning/EIS Files.

Implementation of management actions, within each management category, would be conducted in conjunction with "careful and considered consultation, cooperation, and coordination with lessees, permittees, and landowners involved..." as required by Section 8 of the Public Rangeland Improvement Act (PRIA) of 1978 (P.L. 95-514). Exceptions to management actions could occur under unique situations. Any exception would be negotiated through the consultation process, documented by decision, and listed in the Rangeland Program Summary (RPS) or RPS Update. Examples include:

1) Where the yearlong or seasonal rest requirement would impose an unreasonable economic hardship because the operator had no place to keep livestock during the rest requirement; and rangeland improvements needed to facilitate the requirement were economically unfeasible, the livestock operator could accept additional reductions of livestock numbers or fence the public lands separate from the State or private lands;

2) The livestock operator could implement a "short duration" grazing system in lieu of the rest requirements if the Federal investment did not go below a 1:1 benefit-cost (B/C) ratio and the grazing system met the physiological requirements of the key forage species;

3) The salting recommendation could be altered if it was shown, on a case-by-case basis, that a change would benefit the key forage species and improve range conditions; or

4) Where exceptional or unique resource values; e.g. watersheds, threatened or endangered plants or animals, riparian or other wetland habitat, etc., necessitated change.

Narrative description of the management categories and management actions within each management category appears in Appendix E.

Allotment Categorization

Table I-3 shows allotments within the DPA and the management category in which these allotments have been placed. This Table also reflects the sequence of the allotments on which management development would take place based first on management category (A before B, B before C, etc.) and secondly on the allotment average range condition. For example, a livestock operator with an allotment in Management Category A with an average range condition of 18.03 would have management developed before a livestock operator having an allotment in Management Category A with an average range condition of 19.52. (See Appendix E, Development of the Preferred Alternative and Other Alternatives for methodologies in deriving average allotment range condition.)

Unallotted Public Lands

There are 13,671 acres of public land unallotted for livestock grazing. These lands are unallotted because they consist of small tracts, scattered parcels of public land, the Magdalena Stock Driveway, etc. The BLM Multiple Land-Use Planning Process has

TABLE I-3

ALLOTMENTS WITHIN THE DIVIDE PLANNING AREA* BY MANAGEMENT CATEGORY RANKED IN SEQUENCE OF PRIORITY FOR MANAGEMENT DEVELOPMENT

Management Category	Allotment Number					
A.	None Recommended.					
B.	0109	0064	0145	0135	0018	0172
	0112	0071	0093	0026	0119	0082
	0031	0094	0136	0058	0106	0055
	0110	0051	0030	0066	0183	0163
	0116	0181	0021	0152	0190	0169
	0126	0009	0013	0025	0069	0194
	0010	0084	0017	0005	0029	0102
	0012	0037	0108	0008	0068	0121
	0151	0150	0078	0060	0090	0107
	0022	0001	0088	0089	0176	
	0165	0003	0063	0101	0059	(74 allotments)
	0083	0149	0011	0073	0054	
	0111	0099	0032	0174	0048	
C.	None Recommended.					
D.	0098	0171	0096	0065		
	0156	0188	0044	0053		
	0180	0159	0035	0081		
	0133	0076	0154	0056	(23 allotments)	
	0024	0161	0160	0079		
	0040	0057	0043			
E.	0046	0023	0092	0070		
	0115	0007	0028	0072		
	0047	0087	0148			
	0038	0034	0050	(14 allotments)		
F.	0097	0192	0015	0157	0041	0137
	0020	0128	0039	0117	0170	0144
	0147	0105	0182	0123	0045	0042
	0033	0184	0067	0085	0075	0186
	0074	0118	0153	0103	0127	0091
	0113	0049	0158	0004	0175	0139
	0168	0141	0187	0006	0138	0164
	0173	0142	0179	0100	0193	0124
	0080	0014	0120	0027	0140	0002
	0061	0162	0062	0189	0185	0086
	0095	0155	0132	0077	0146	0130
	0114	0125	0166	0019	0177	
	0104	0143	0167	0036	0178	(76 allotments)

* See Visual A in map pocket at back of document.

Source: BLM Socorro District Planning/EIS Files.

identified that by September 30, 1983, BLM would have determined the feasibility of either retaining the unallotted public lands as administrative sites for use as BLM-owned horse pastures, range study exclosures, or allocating the lands to livestock grazing or other resource uses in conjunction with the Preferred Alternative. If these lands, or a portion thereof, are allocated to livestock grazing use, they would be placed within one of the six management categories and inherent management actions would be implemented.

Vegetation Allocated to Livestock Grazing and Other Uses

Because of current range condition, acres of public land within the allotment, and current management, none of the allotments in the DPA were placed in Management Category A which would require an immediate adjustment in livestock numbers. BLM proposes not to implement adjustment in livestock numbers except for instances that may be applicable to allotments in Management Category B. The third management action in Management Category B (which is optional) refers to the adjustment of livestock numbers if: a) the consultation parties cannot agree on season-of-use and distribution management; b) the consultation parties agree that an adjustment in livestock numbers would be needed in addition to season-of-use and distribution management or; c) the monitoring studies over a long-term period indicate that an adjustment in livestock numbers would be needed to improve range condition.

For allotments within Management Categories A, B, and C it may be demonstrated during the consultation, management development, and initial decision process that an adjustment of livestock numbers would be needed to improve range condition. Since no one forage survey method can accurately and consistently determine livestock grazing capacity, and there are many variables involved (such as climatic fluctuations, or season-of-use and distribution problems), a range of numbers would be used to determine grazing capacity. The following methodologies have been used to determine this range of numbers for a high-low livestock grazing capacity stocking level by allotment:

1) Fourteen-Year Licensed Use - The mean, median, and mode of the 14-year licensed use was determined.

2) Range Site Guide to Suggested Stocking Rates - The high/low livestock grazing capacity for each allotment based upon range sites and condition classes occurring within each allotment was determined using the Soil Conservation Service (SCS) Range Site Descriptions.

3) Range Condition Stocking Method - The livestock grazing capacity for each allotment was computed by determining what percent of an allotment was in each condition class. An adjustment factor was then applied to each percent of the allotment in each condition class. The sum of the percent of each condition class in the allotment times the adjustment factor of each condition class was equal to a percent of the proposed livestock grazing capacity to the current livestock grazing capacity.

The adjustment factor for poor condition range was 65 percent of the present livestock grazing capacity; fair condition range was 80 percent of the present livestock grazing capacity; and good and excellent condition range was 100 percent of the present livestock grazing capacity.

Table I-4 summarizes existing livestock grazing preference and the range of numbers for livestock stocking levels computed by the above methods for all allotments within the DPA. This range of numbers would be used for initial consultation if it were determined that an adjustment in livestock numbers would be needed. Any livestock number adjustments, reached through consultation for Management Categories A, B, or C, would be limited in regard to maximum livestock numbers to the extent that the annual livestock use would not exceed the 14-year licensed use. Also, any suspensions of livestock preference would be consistant with 43 CFR 4110.3-2 "Decrease in Forage." Specific information relevant to problems regarding kind and class of livestock is not available at this time; however, during the management development process this information will be obtained.

Implementation of management by category would increase the existing AUM forage allocation level of 141,600 (estimation modified from Gray et al. 1977) by an additional 20,400 AUMs resulting in 162,000 AUMs of forage allocation by the year 2000. This would not meet an anticipated demand of 178,200 AUMs on public lands (DPA-Planning Area Analysis-BLM Socorro District Planning/EIS Files) in the DPA by the year 2000. The DPA has a potential for producing approximately 250,000 AUMs on public land.

The Preferred Alternative would assist in the increase of big game (mule deer, pronghorn antelope, and elk) AUMs from the current required level of 4,758 to 9,949 AUMs by the year 2000. This increase in AUMs would provide all forage necessary to sustain big game numbers within the DPA. Wildlife forage would be proportionally allocated on an allotment-by-allotment basis as range condition improves, prior to being allocated to livestock. This allocation process would be dependent upon both range management and wildlife habitat monitoring studies. Figure I-1 illustrates domestic livestock and wildlife forage allocations for the Preferred Alternative. There are no wild, free-roaming horses or burros within the DPA; therefore, no forage would be allocated to their use.

By the year 2000, implementing only grazing management actions inherent to the Preferred Alternative would modify range condition ratings on public lands in the following manner:

	Acres	
Range Condition Class	From	To
Excellent	1,892	86,664
Good	441,436	493,847
Fair	446,859	315,070
Poor	8,948	3,554
Total	899,135	899,135

TABLE I-4
CURRENT LIVESTOCK GRAZING PREFERENCE
AND RANGE OF LIVESTOCK STOCKING
FOR CONSULTATION PURPOSES ON ALLOTMENTS WITHIN THE DPA
(IN FEDERAL AUMS)

ALLOTMENT NO.	FEDERAL PREFERENCE	14-YEAR LICENSED USE			RANGE SITE GUIDE		RANGE CONDITION STOCKING METHOD
		MEAN	MODE	MEDIAN	HIGH	LOW	
0001	134	132	134	134	123	64	97
0002*	120	120	120	120	105	59	96
0003*	132	105	132	132	107	54	106
0004	960	938	968	968	2,883	1,867	952
0005	180	149	0	108	227	129	151
0006*	8	8	8	8	128	82	8
0007	180	140	162	162	149	84	149
0008	780	522	786	568	652	381	659
0009	408	306	298	298	334	188	327
0010*	2,448	2,624	2,442	2,442	2,059	1,090	1,992
0011*	1,248	1,177	1,173	1,173	1,514	850	1,024
0012*	144	157	144	144	131	75	114
0013	221	174	180	180	244	130	177
0014	60	75	72	72	83	47	54
0015	72	72	72	72	63	32	65
0017	221	218	224	224	237	129	176
0018*	1,128	1,030	1,133	1,133	1,135	657	950
0019**	120	121	121	121	242	154	120
0020**	96	96	96	96	94	51	76
0021*	960	895	956	956	771	456	781
0022*	336	327	336	288	424	239	268
0023*	2,688	2,356	2,356	2,196	1,974	1,149	2,230
0024	2,448	2,027	1,892	1,892	2,911	1,829	2,184
0025	1,332	1,163	1,347	1,347	1,149	672	1,115
0026*	240	258	252	252	404	239	196
0027	108	106	108	108	122	0	106
0028*	3,993	4,446	4,526	4,526	5,567	3,505	3,536
0029	1,152	826	881	817	978	573	1,011
0030	864	431	450	450	638	352	704
0031**	111	122	129	129	117	56	86
0032	7,020	4,463	4,277	4,277	7,639	4,470	5,873
0033	132	131	132	132	90	51	106
0034*	168	170	170	170	104	63	144
0035	504	455	489	489	782	529	477
0036**	12	12	12	12	40	25	12
0037*	180	182	180	180	145	84	144
0038*	1,716	1,178	1,178	1,284	1,712	984	1,395
0039	12	12	12	12	11	7	11
0040	36	36	36	36	35	21	29
0041	360	261	360	290	479	312	358
0042	60	60	60	60	45	29	60
0043	3,840	3,132	3,050	3,050	5,204	3,088	3,661

TABLE I-4
CURRENT LIVESTOCK GRAZING PREFERENCE AND RANGE OF LIVESTOCK STOCKING FOR CONSULTATION PURPOSES ON ALLOTMENTS WITHIN THE DPA
(IN FEDERAL AUMS)

ALLOTMENT NO.	FEDERAL PREFERENCE	14-YEAR LICENSED USE			RANGE SITE GUIDE		RANGE CONDITION STOCKING METHOD
		MEAN	MODE	MEDIAN	HIGH	LOW	
0044	720	611	537	567	922	575	680
0045	36	35	36	36	70	45	36
0046 * *	1,212	1,335	1,335	1,335	1,114	606	950
0047	1,392	1,289	984	1,049	1,285	749	1,110
0048 * *	864	746	744	744	1,008	592	759
0049 * *	76	56	72	72	72	35	61
0050 *	864	643	648	643	1,315	667	808
0051	836	836	872	861	878	463	680
0053 * *	1,764	893	893	893	2,267	1,398	1,740
0054	6,936	4,980	4,980	4,905	10,050	6,545	6,146
0055	552	283	312	306	666	396	300
0056	2,340	992	1,261	949	4,035	2,660	2,318
0057	1,536	844	1,043	964	2,294	1,447	1,497
0058	3,600	3,351	3,528	3,528	3,859	2,257	3,008
0059	240	197	240	240	279	163	209
0060 * *	508	374	374	374	377	229	435
0061	60	55	56	57	52	25	49
0062	1,243	910	946	857	1,248	796	1,201
0063 *	900	865	900	887	1,297	772	742
0064 *	478	480	480	480	652	374	382
0065 *	36	36	36	36	43	28	36
0066 *	301	298	301	301	352	199	251
0067	540	388	388	368	463	287	509
0068	192	173	194	180	351	207	162
0069 *	588	588	588	588	467	266	513
0070 * *	11,880	4,066	3,696	3,696	18,678	10,457	11,068
0071	312	318	312	312	308	152	250
0072	2,328	2,127	2,034	2,034	2,998	1,910	2,237
0073	192	225	194	194	221	132	162
0074 * *	72	36	72	31	81	41	58
0075	48	47	48	48	112	71	48
0076	11,472	13,329	13,973	13,928	17,306	11,219	10,621
0077 *	96	96	96	96	212	135	95
0078 *	1,804	1,587	1,672	1,672	2,399	1,120	1,479
0079	2,400	2,207	2,080	2,205	2,796	1,650	2,372
0080	84	135	168	168	52	27	67
0081 *	2,100	1,449	1,398	1,398	2,347	1,433	1,993
0082	240	211	228	229	305	171	216
0083 *	240	219	240	240	182	105	192
0084	204	203	204	204	166	81	163
0085	192	180	192	192	189	130	189
0086 *	144	144	144	144	99	58	115

TABLE I-4
CURRENT LIVESTOCK GRAZING PREFERENCE AND RANGE OF LIVESTOCK STOCKING FOR CONSULTATION PURPOSES ON ALLOTMENTS WITHIN THE DPA
(IN FEDERAL AUMS)

ALLOTMENT NO.	FEDERAL PREFERENCE	14-YEAR LICENSED USE			RANGE SITE GUIDE		RANGE CONDITION STOCKING METHOD
		MEAN	MODE	MEDIAN	HIGH	LOW	
0087	5,304	5,874	6,306	5,578	4,214	2,551	4,456
0088 *	240	240	240	240	707	406	192
0089 *	18	18	18	18	31	18	14
0090	31	32	33	32	51	30	24
0091 *	24	24	24	24	46	31	24
0092 *	3,780	3,998	4,236	3,980	3,408	2,041	3,225
0093	444	406	448	448	746	384	353
0094	1,488	1,311	1,455	1,348	1,503	854	1,183
0095 *	48	40	48	48	47	27	38
0096	912	810	807	825	1,137	740	862
0097	108	108	108	108	95	56	86
0098 **	70	60	59	59	66	32	49
0099 *	420	513	517	517	462	255	335
0100 *	576	574	618	617	973	630	570
0101	2,364	1,648	1,706	1,626	3,003	1,755	1,994
0102 *	708	660	660	660	917	570	641
0103	228	205	275	206	311	197	225
0104 *	48	26	24	24	34	19	38
0105 *	24	24	24	24	25	13	19
0106 *	408	396	408	408	265	149	348
0107	1,792	1,883	1,790	1,792	1,829	1,149	1,617
0108	132	91	80	80	106	59	107
0109	852	707	912	832	740	385	632
0110	672	623	673	673	596	267	527
0111	240	241	241	241	397	201	147
0112	312	288	312	312	209	118	228
0113 **	3	3	3	3	4	3	2
0114 *	3	3	3	3	3	2	2
0115	168	151	168	168	143	83	133
0116 **	514	458	476	476	452	262	403
0117	108	111	108	108	160	103	105
0118 **	6	6	6	6	6	4	5
0119 *	444	430	448	448	392	239	380
0120 *	264	242	264	264	362	233	254
0121 *	24	24	24	24	32	21	21
0123 *	288	233	288	288	576	370	282
0124 *	6	6	6	6	9	5	6
0125 *	72	6	6	6	100	68	70
0126 *	1,895	1,985	1,980	1,947	1,845	986	1,511
0127	156	162	161	162	209	132	156
0128	48	48	48	48	31	18	38
0130	24	48	48	48	29	14	19

TABLE I-4
CURRENT LIVESTOCK GRAZING PREFERENCE AND RANGE OF LIVESTOCK STOCKING FOR CONSULTATION PURPOSES ON ALLOTMENTS WITHIN THE DPA
(IN FEDERAL AUMS)

ALLOTMENT NO.	FEDERAL PREFERENCE	14-YEAR LICENSED USE MEAN	MODE	MEDIAN	RANGE SITE GUIDE HIGH	LOW	RANGE CONDITION STOCKING METHOD
0132	48	44	48	47	39	25	46
0133	600	600	600	600	576	353	572
0135 *	252	260	252	252	186	106	209
0136 *	1,284	1,320	1,320	1,320	948	470	1,041
0137 *	55	55	55	55	46	30	55
0138	120	132	120	120	196	135	120
0139 *	8	8	8	8	22	14	8
0140	144	144	144	144	136	85	144
0141	120	120	120	120	111	61	102
0142	36	36	36	36	21	14	31
0143 *	48	4	4	4	28	17	41
0144	48	41	48	48	41	27	48
0145 *	228	220	228	228	270	160	184
0146 **	72	72	72	72	107	74	72
0147 * *	120	120	120	120	83	49	96
0148	1,503	1,385	1,463	1,441	1,488	978	1,357
0149	60	60	60	60	93	57	48
0150	180	180	180	180	143	81	144
0151 *	156	153	225	156	157	89	124
0152 *	24	26	26	26	31	18	20
0153 * *	972	788	728	736	970	622	911
0154	2,100	1,759	2,108	1,820	1,698	1,099	2,094
0155	1,500	571	657	703	537	355	1,443
0156	252	251	255	255	403	218	231
0157	48	48	48	48	65	43	47
0158 *	518	522	522	522	287	183	496
0159 *	2,448	2,349	2,451	2,451	2,910	2,057	2,394
0160 * *	2,220	2,313	2,213	2,213	4,280	2,364	2,110
0161	3,600	1,811	1,200	1,694	4,188	2,645	3,462
0162 *	288	288	288	288	227	137	261
0163	1,764	1,212	941	943	898	568	1,391
0164 * *	12	8	7	7	17	12	12
0165 *	348	275	350	306	349	190	276
0166	96	96	96	96	83	58	94
0167	120	120	120	120	144	95	113
0168 * *	48	48	48	48	50	29	38
0169 *	189	182	189	189	407	246	169
0170	276	315	336	336	262	184	276
0171 **	1,583	1,583	1,583	1,583	1,680	1,087	1,583
0172 *	391	380	391	391	277	164	345
0173 **	60	60	60	60	51	29	48
0174	1,901	1,867	1,901	1,901	1,140	710	1,591

TABLE I-4
CURRENT LIVESTOCK GRAZING PREFERENCE AND RANGE OF LIVESTOCK STOCKING FOR CONSULTATION PURPOSES ON ALLOTMENTS WITHIN THE DPA
(IN FEDERAL AUMS)

ALLOTMENT NO.	FEDERAL PREFERENCE	14-YEAR LICENSED USE			RANGE SITE GUIDE		RANGE CONDITION STOCKING METHOD
		MEAN	MODE	MEDIAN	HIGH	LOW	
0175	151	151	151	151	220	140	151
0176 *	508	493	508	508	471	272	434
0177 *	156	151	156	156	76	49	156
0178 *	63	63	63	63	62	40	63
0179 *	12	12	12	12	26	17	12
0180 *	22	22	22	22	215	136	21
0181 *	376	360	376	376	427	233	301
0182 *	24	24	24	24	94	58	22
0183 *	290	279	290	290	247	139	247
0184 *	12	12	12	12	24	14	10
0185 **	87	85	84	84	102	66	87
0186 *	24	23	24	24	34	26	24
0187 *	336	336	336	336	388	245	323
0188 *	384	384	384	384	541	365	369
0189 *	462	446	462	462	703	475	457
0190 **	324	324	324	324	297	167	276
0192 **	36	36	36	36	32	19	29
0193	168	162	162	168	155	101	168
0194 **	311	428	428	428	605	395	277
TOTAL	153,406	129,383	131,487	129,451	182,353	109,904	136,282

* LESS THAN 14 BUT GREATER THAN 7 YEARS LICENSED USE.

**LESS THAN 8 YEARS LICENSED USE.

SOURCE: BLM SOCORRO DISTRICT PLANNING/EIS FILES.

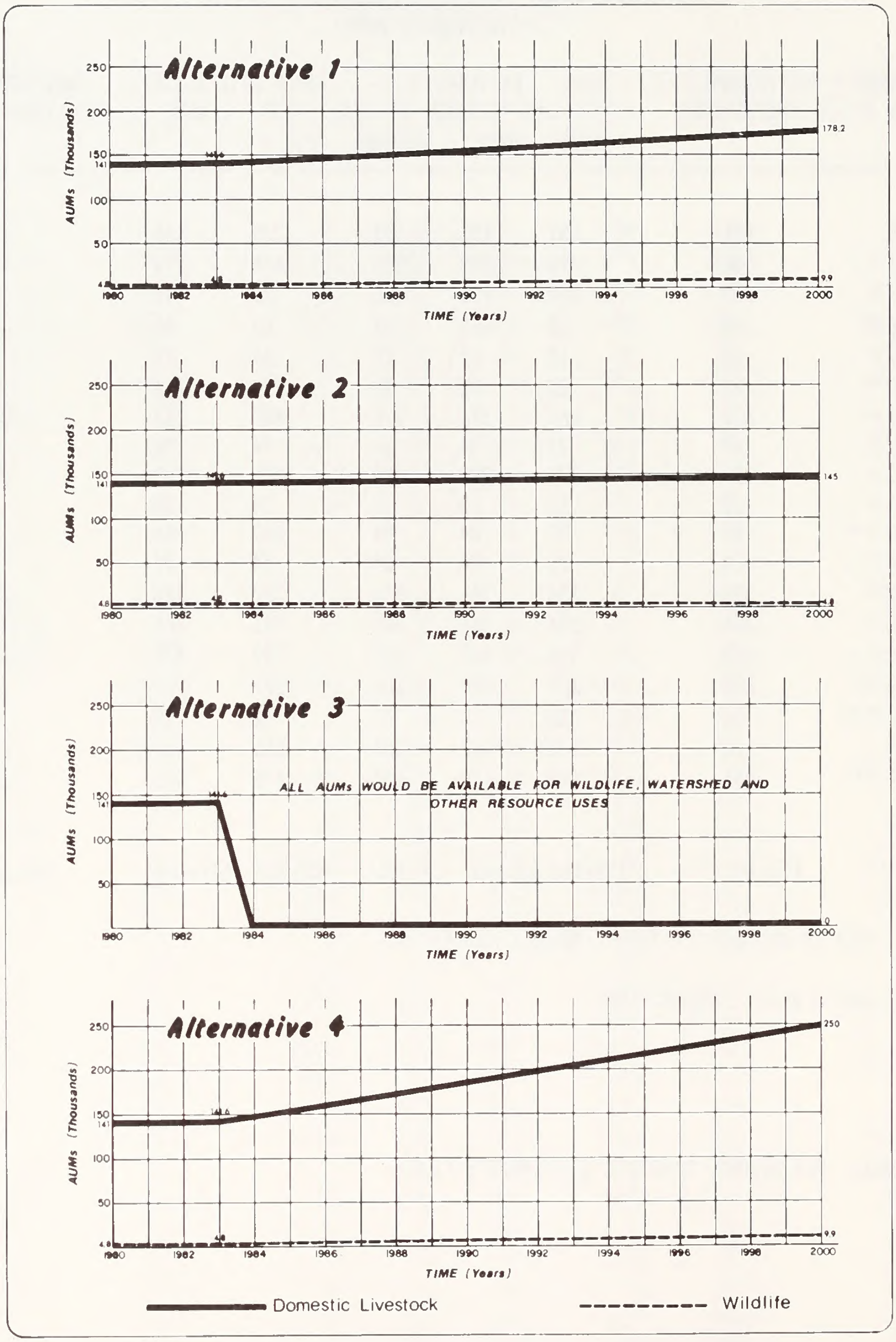


FIGURE I-1. Forage Allocation (AUMs)

These figures are based on a 1-percent annual increase from good to excellent range condition rating, a 2-percent annual increase from fair to good range condition rating, and a 5-percent annual increase from poor to fair range condition rating through the year 2000.

In addition, in order to adequately determine the potential of a range site, the BLM Socorro District proposes to construct a 100-acre fenced exclosure on each of the 33 range sites within the DPA. This would also assist efforts to maintain an inventory of range conditions as mandated by PRIA of 1978.

Monitoring and Evaluation of the Preferred Alternative

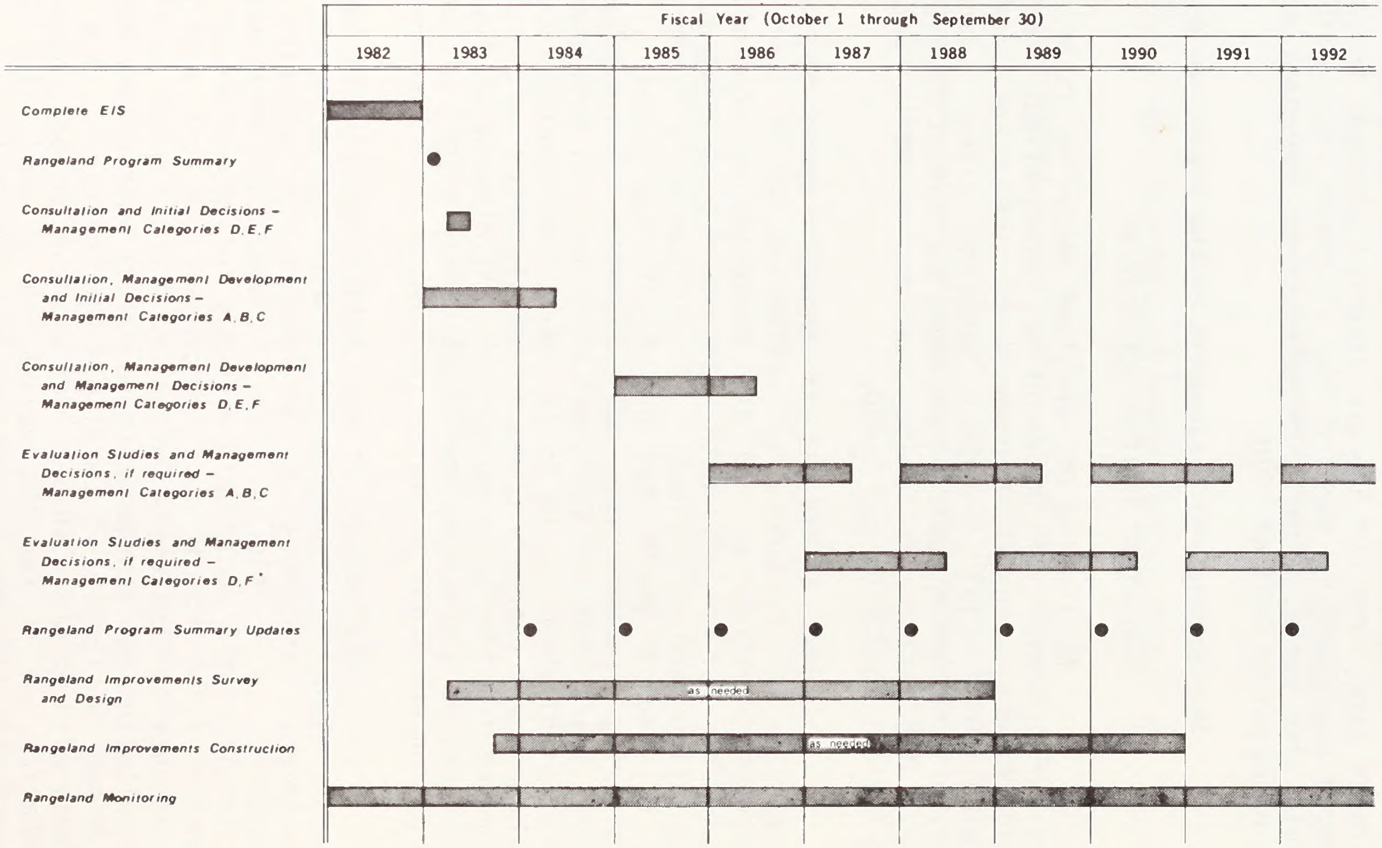
Rangeland Monitoring Program

Monitoring of rangeland resources is necessary to evaluate the effectiveness of implementing season-of-use management, rangeland improvements, the effectiveness of vegetative land treatments, and evaluating initial livestock stocking rates. Rangeland management monitoring studies would be designed to collect data on actual livestock use, utilization of forage species, climatic data, and rangeland ecological condition and trend.

All allotments in the DPA would be monitored; however, intensity and frequency of monitoring would vary according to the management categories and BLM budgetary constraints or limitations. Techniques for collecting the data would be consistent with existing BLM regulations and guidelines. All allotments in Management Categories A, B, C, and E would be intensively monitored. Implementation of monitoring studies began on allotments in Management Category B in fiscal years 1981 and 1982, and allotments in Management Category E have been established for 10 to 14 years. Monitoring studies on allotments in Management Category D would be implemented on the pasture or pastures proposed for intensive management. Allotments in Management Category F would be, as a minimum, monitored to the extent of rangeland ecological condition and trend to ensure that range condition does not deteriorate.

Evaluation of the monitoring studies would be conducted over a recurring 18-month cycle with approximately one-half of the management categories by allotment, in priority sequence, being evaluated in a fiscal year. Evaluating monitoring studies on a continuing basis would determine any future management actions needed to improve range conditions. Implementation of monitoring studies on allotments in Management Categories D and F would be concurrent with the consultation and management development phases. The evaluation schedule, as shown in Figure I-2, parallels the evaluation time frames required to comply with 43 CFR 4110.3-2 "Decrease in forage", Section (e), which, in summation, calls for the evaluation of monitoring data from which a phased reduction may be modified by a new decision.

FIGURE I-2. Implementation, Management Development, and Evaluation Schedule for the Preferred Alternative



* E Category Allotments would be regrouped with B Category following consultation

Source: BLM Socorro District Planning/EIS Files

Wildlife Habitat Monitoring Program

The BLM Socorro District current wildlife habitat monitoring program consists of the following types of studies. These studies would be applicable to all alternatives discussed in this Chapter. All studies would be conducted either annually or biannually and would provide line management adequate data upon which to base decisions.

Habitat condition and trend will be monitored by conducting 3 foot by 3 foot photo plot studies, point quadrat method (collecting point, cover, and density data), and browse utilization transects. Wildlife species utilization studies of various habitats would consist of continuing wintering raptor surveys, small mammal trapping transects, bird count transects, aerial antelope fawning areas and antelope distribution surveys, big game fecal analysis studies, mule deer pellet group transects, mule deer and elk wintering area surveys and wetland/riparian habitat studies.

Implementation, Management Development, and Evaluation Schedule

Within five months following completion of this EIS (by March 1, 1983), an RPS would be published outlining the BLM Socorro District Manager's final multiple land-use decision. This document would reflect the consultation, management development, and decision schedule for each allotment (Figure I-2).

Initial decisions would be issued on allotments in Management Categories D, E, and F immediately following approval of the RPS. These decisions would contain the initial stocking rates for those allotments based on recommendations made in the planning documents and analyzed in the EIS. The planning documents state that initial stocking rates would not exceed grazing preference. The management development process for D, E, and F allotments would begin October 1, 1984, and end 18 months later. Any adjustments in stocking rates determined to be necessary during the management development process would be implemented by subsequent decisions as the management development process is completed.

The management development and decision process for allotments in Categories A, B, and C would begin prior to March 1, 1983, and be completed 17 months later. Intensive consultation would be conducted on all allotments for the purposes of developing a comprehensive management plan for the allotment. Decisions would be issued progressively as the management development process is completed.

Rangeland Improvements

Rangeland improvements and vegetative land treatments would be required to achieve the objectives of Alternative 1. Since the level of intensity of grazing management for each allotment has not been determined, it is not specifically known how many or what type of rangeland improvements would be needed. A preliminary list of rangeland improvements has been developed from data supplied by DPA livestock operators. This list is summarized in Appendix E, Table E-1, and would be used for analysis purposes. A comprehensive list of rangeland improvements would be developed during consultation with each allottee and would be included in each RPS update.

The preliminary rangeland improvements proposed in Alternative 1 consist mainly of fences and water developments. The total preliminary rangeland improvements by management categories are:

Management Category A - None

Management Category B - 30 miles of fence, 42 miles of pipeline, drilling or equipping 7 wells, and 17 pit tanks.

Management Category C - None

Management Category D - 5 miles of fence, 12 miles of pipeline, drilling or equipping 2 wells, and 2 pit tanks.

Management Category E - 2 miles of fence, 3 miles of pipeline, and 3 pit tanks.

Management Category F - 10 miles of fence, 8 miles of pipeline, 1 well, and 5 pit tanks.

Vegetative Land Treatments

BLM Socorro District proposes to implement vegetative land treatments on a maximum of 353,320 acres within the DPA. Conducting these treatments as part of Alternative 1 would produce an additional 16,200 AUMs which would then meet the anticipated demand for 178,200 AUMs on public lands in the DPA by the year 2000. These vegetative land treatments are described in the following discussion. Map I-2 shows the location of treatment areas and methods of manipulation for Alternative 1.

BLM proposes to control pinyon-juniper and rabbitbrush encroachment on an estimated maximum 299,560 acres of public land. The methods of control would be mechanical, herbicide, and prescribed burning and would be required to pass a 1:1 B/C analysis.

The mechanical methods of control consist of pushing a rubber-tired or tracked vehicle over pinyon-juniper, and root plowing of rabbitbrush. This would be accomplished on an estimated maximum 37,800 acres of public land.

Two herbicides, Graslan and Tordon 10k, are currently proposed for use on pinyon-juniper and rabbitbrush encroachment on an estimated maximum 26,880 acres. Tebuthiuron is the active ingredient in Graslan and Picloram is the active ingredient in Tordon 10k. Both are

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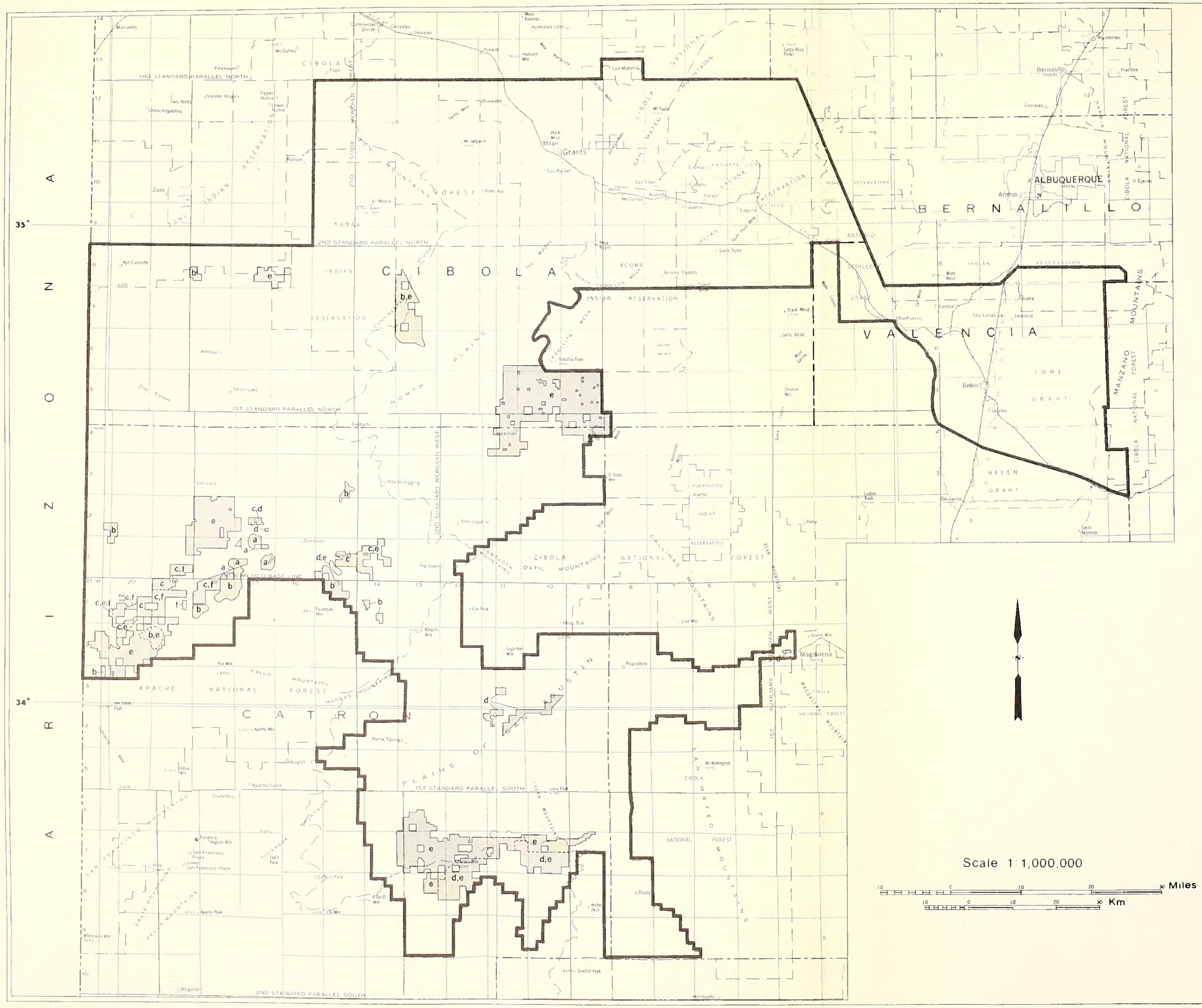
WEST SOCORRO
RANGELAND MANAGEMENT PROGRAM
ENVIRONMENTAL IMPACT STATEMENT

MAP I-2. Vegetative Land Treatments under Alternative 1



— Divide Planning Area Boundary

LEGEND

▨ PROPOSED AREA FOR VEGETATIVE LAND TREATMENT(S)

a – Chaining Maintenance
b – PJ Control
c – Herbicide Spraying
d – Seeding
e – Prescribed Burning
f – Ripping, Pitting, Furrowing

Source: BLM Socorro District Planning/EIS Files

pelletized, and would be broadcasted aerially or by hand on each individual plant species such as pinyon-juniper. Graslan would be applied at a rate of 1 to 2 pounds per acre and Tordon 10k would be applied at a rate of 3 to 6 pounds per acre. Only Federally registered herbicides approved for use by the Department of Interior and the Environmental Protection Agency (EPA) would be used on public lands.

Prescribed burning or fire management plans would be implemented on an estimated maximum 234,880 acres of public land as a tool to check encroachment of pinyon-juniper and undesirable shrubs. It could also be used as a management tool on rabbitbrush in addition to herbicide control. These plans are an integral part of the Preferred Alternative and would be completed before prescribed burning or fire management is implemented. Fire management plans have been written for the Pelona, Horse Mountain, and El Malpais areas and would also be written on a regional basis for the Quemado area and the San Augustine Plains.

Other proposed vegetative land treatments to improve rangeland condition, within the DPA, would consist of pitting, contour ripping, and contour furrowing on approximately 17,280 acres of public land. These types of land treatments are designed mainly to break up the blue grama sod, increase forage production, encourage more productive mixes of native grasses, reduce runoff, and break compacted layers that inhibit root development and moisture penetration.

BLM also proposes to seed or interseed an estimated maximum 36,480 acres of public land. The seeding may be performed in conjunction with other land treatments and in areas affected by insect damage such as the white grub infestation of 1978-80. The purpose of the seeding is to improve forage quality and production and improve the species mix; i.e., cool-season grasses, forbs, and browse species. In order to effectively seed the proper mixture and gain knowledge of proper species selection for a site, BLM would perform seeding trials on 2-acre plots on each of 33 range sites in the DPA.

In order to implement these vegetative land treatments and those proposed with other alternatives, the following criteria must be met: 1) must exhibit an acceptable B/C ratio; 2) all treatments seeded must receive two continuous year's rest, within which must occur two continuous growing seasons (March 1 - November 1) of complete rest from livestock grazing; 3) all vegetative land treatments performed without seeding must receive one continuous and complete growing season (March 1 - November 1) rest from livestock grazing; 4) all land treatments must have a plan of action or be part of an existing AMP or the ESP; 5) seedings shall have a minimum proportionate ratio of 20-percent forbs, 20-percent browse, 60-percent grasses in the seed mix, or shall be the same proportions as described in the appropriate range site guide; 6) seed mixtures should consist of not less than two species of forb, browse and grass, in order to avoid problems associated with monocultures (actual seedings would be dependent upon site-specific need); and 7) the benefitting program(s); i.e., range management, must consult with other programs; i.e., wildlife, watershed, etc., in order to determine the most cost effective and resource effective land treatment methodology. Chemical vegetative treatments would be conducted utilizing the same chemicals and guidelines discussed in Alternative 1 and standards for all chemical treatment projects will conform to or surpass U.S. EPA, U.S.Department of the Interior (USDI), and BLM rules, regulations and guidelines (reference BLM Socorro District Planning/EIS Files).

Standard Operating Procedures

When rangeland improvements and vegetative land treatments are implemented on public land, BLM would adhere to procedures and design specifications to protect all resource uses. These actions are mandated through Laws, Executive Orders, BLM manual requirements, and policy. This EIS analyzes the environmental consequences of proposed rangeland improvements and, in addition, subsequent analysis would be conducted to address localized impacts (resource clearances) to assist BLM planning and decision-making. The following committed procedures would be used in constructing proposed rangeland improvements and applying vegetative land treatments:

1) Roads or trails would be constructed only where existing roads and trails could not be used or when off-road travel is not possible.

2) Disturbance of soil and vegetation at all project sites would be held to a minimum.

3) Construction of all fences would be in accordance with design constraints in the current BLM Manual Section 1737.

4) Areas where the soils would be disturbed would be reclaimed.

5) Soil maps and the BLM soil scientist and hydrologist would be consulted to determine areas where construction projects would have the least amount of impacts; e.g., areas on steep slopes and soils in critical or severe erosion condition class would be avoided.

6) A threatened, endangered, State listed, or sensitive species clearance would be conducted by a BLM resource specialist (biologist or botanist) prior to the beginning of any project. If a "may affect" situation is encountered, consultation would be undertaken with the agency [U.S. Fish and Wildlife Service (FWS), New Mexico Department of Game and Fish (NMDG&F), or the New Mexico State Heritage Program (NMSHP)] listing the species which may be affected. The results of the consultation would determine the course of action necessary to avoid adverse effects on listed species.

7) During nesting season, a raptor inventory would be conducted on areas proposed for vegetative land treatment to identify and flag land within a one-quarter mile radius (or as determined through field investigations) of active nests so they would not be disturbed by the proposed treatment.

8) New or expanded grazing use and support facilities would be regulated so that impairment of suitability for designation of proposed Areas of Critical Environmental Concern (ACECs) or crucial wildlife habitat would be evaluated and a decision made on a case-by-case basis.

9) Lands under wilderness review would be managed in a manner that would not impair the area's suitability as wilderness according to policy guidelines identified in BLM's Interim Management Policy and Guidelines for Land Under Wilderness Review (1979). Should any lands be designated as wilderness by Congress, such areas would be managed according to BLM's Wilderness Management Policy (1981) so as to ensure protection of wilderness values.

10) BLM would conduct cultural resource management inventories on areas where surface disturbance would occur during project implementation. In all circumstances, BLM would consult with the State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation (ACHP) in accordance with the Programmatic Memorandum of Agreement (PMOA) between BLM, the ACHP, and the National Conference of State Historic Preservation Officers, dated January 14, 1980.

11) Visual resource contrast ratings would be completed as part of subsequent analysis prior to construction of all proposed rangeland improvements and vegetative land treatments. If appropriate, mitigating measures would be developed on a case-by-case basis.

12) All refuse would be removed from work areas on public land.

13) Perennial watering sources would be provided for wildlife at all suitable public land livestock watering facilities.

14) Escape ramps would be required in all water troughs and open storage tanks.

15) Vegetative land treatments would not take place within riparian or other wetland areas. Rangeland improvements would be designed to provide maximum protection or enhancement of these areas.

16) Vegetative land treatments would be conducted to provide optimum opening cover ratio areas for wildlife.

17) Vegetative land treatments would be performed on topographic contours, wherever possible.

If the Preferred Alternative is implemented, the workload would be evenly distributed within the BLM Socorro District Office. Implementation of the Preferred Alternative would result in the expenditure of approximately $7 million (1982 costs) of Federal Government funds through the long term.

In addition, the Preferred Alternative would provide, in part, stability to the regional livestock industry by presenting a concerted

10-year range management program. The livestock industry would be able to perform long-term planning of its own and coordinate actions with the New Mexico State Land Office (NMSLO) and BLM.

Alternative 2 (No Action)

The No Action Alternative would be a continuation of the current BLM Socorro District range management program. Authorized livestock numbers would remain constant and livestock numbers on allotments under intensive management may be adjusted if monitoring studies indicate a change in livestock grazing capacity. AUMs would increase at an estimated constant rate of 200 per year from the estimated current forage allocation of 141,600 to 145,000 AUMs by the year 2000. The existing 13 allotments within the DPA with developed AMPs and the one ESP would continue current operations; any necessary revisions would be made based on the results of monitoring studies. The remaining 173 allotments would not be managed intensively. Existing rangeland improvements would be maintained and BLM would construct new livestock rangeland improvements only on allotments with existing AMPs. Wildlife, watershed, and other resource use improvements would continue to be constructed under current procedure. Livestock operator-built rangeland improvements would be processed under permits as at present. Any rangeland improvements and cooperative agreements for rangeland improvements would be approved on a case-by-case basis after site-specific analyses were prepared. Trespass control would occur on all allotments. Forage allocation to wildlife would remain constant at the current level of 4,758 AUMs through the year 2000 (Figure I-1 shows forage allocation under Alternative 2). Implementation of the No Action Alternative would result in the expenditure of approximately $3.2 million (1982 costs) of Federal Government funds through the long term.

Alternative 3 (Elimination Of Livestock Grazing)

Under this alternative, all domestic livestock grazing on 986,092 acres of public land within the DPA would be discontinued. No grazing authorizations would be issued and no AMPs would be developed. All forage would be reserved for the wildlife, watershed programs, or other resource uses (Figure I-1 illustrates forage allocation under Alternative 3). To ensure that domestic livestock were not grazed on public lands (which is interspersed with State and private lands) an estimated 2,554 miles of fence would need to be constructed by the private landowner or State land lessee. New rangeland improvements would be constructed on public lands only if required for other resource uses. Existing improvements would be maintained by BLM only if required for other resource uses; e.g., wildlife, and would otherwise be removed. The range management program within the DPA would be limited to trespass detection and processing trespass cases. Implementation of the Elimination of Livestock Grazing Alternative would result in the expenditure of approximately $660,000 (1982 costs) of Federal Government funds through the short term.

Alternative 4 (Maximization Of Livestock Forage Production)

This alternative is designed to provide intensive management (AMPs) on all allotments within the DPA and to apply vegetative land treatments to achieve maximum forage production for domestic livestock utilization. In addition to total allotment management, vegetative manipulation treatment would be implemented on a maximum of 545,815 acres of public land to convert existing vegetative areas to more desirable livestock forage.

The range of initial, authorized stocking rates and AUMs would be the same as the rates and AUMs described in Alternative 1. Through the implementation of the following described vegetative treatments and total management of all allotments, anticipated forage allocation to livestock would increase to the full potential of 250,000 AUMs by the year 2000. Initial and future forage allocations to big game populations would be 4,758 AUMs and 9,949 AUMs, respectively (Figure I-1 illustrates forage allocation under Alternative 4).

In addition to developing AMPs on 173 allotments, implementation of this alternative would entail controlling pinyon-juniper on 58,238 acres of public land, discing and interseeding 56,159 acres, pitting, ripping, and furrowing 26,746 acres, controlled burning of 363,335 acres, and chemically treating 41,337 acres of public land. Map I-3 illustrates the general location of treatment areas, and methods of manipulation for Alternative 4.

Monitoring studies would be conducted to determine the effects of vegetative treatments and management systems. These studies would consist of actual use, key forage species utilization, rangeland condition and trend, and climate.

Implementation of the Maximization of Livestock Forage Production Alternative would result in the expenditure of approximately $7.4 million (1982 costs) of Federal Government funds through the long term; cost expenditures do not include rangeland improvements.

AUTHORIZING ACTIONS

Each livestock operator would be issued a term permit through the BLM Socorro District Office for public land utilization. The permit would specify the allotment, period of use, distribution, numbers and kind of livestock, and maintenance requirements of rangeland improvements. Permits to graze in excess of the authorized use would be issued at the discretion of the San Augustine Resource Area Manager during periods of excess forage production. Changes in use that would be above the limits set by the permit would have to be requested in writing by the livestock operator and approved in advance of the grazing use. Grazing use above the limits set by the permit without authorization would be considered trespass, and trespass action would be taken by BLM in accordance with regulations in 43 CFR 4150 (Unauthorized Grazing Use). No other Federal permits, licenses, or other entitlements must be obtained in order to implement the Preferred or other alternatives.

INTERRELATIONSHIPS

Federal Programs

National Environmental Policy Act - This EIS has been prepared to fulfill the intent of Section 102(2) of NEPA (83 Stat. 852; 42 U.S.C. 4321-4347) and the Council on Environmental Quality Regulations for implementing the procedural provisions of NEPA (40 CFR 1500-1508). The Preferred Alternative and other alternatives considered have been designed to afford decisions that will achieve the requirements of the environmental policy established in Section 101 of NEPA.

It is the policy of the Federal government, in conjunction with State and local governments and other concerned public and private organizations, to use all feasible means and measures (including financial and technical assistance) to: 1) foster and promote the general welfare; 2) create and maintain conditions under which man and nature can productively exist; and 3) fulfill the social, economic, and other requirements of present and future generations. There are six specific environmental objectives of Federal actions set forth in Section 101(b) of NEPA as follows:

1) "To fulfill the responsibilities of each generation as trustee of the environment for succeeding generations.

2) To assure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings.

3) To attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable or unintended consequences.

4) To preserve important historic, cultural, and natural aspects of our national heritage, and maintain, wherever possible, an environment which supports diversity and variety of individual choice.

5) To achieve a balance between population and resource use that will permit high standards of living and a wide sharing of life's amenities.

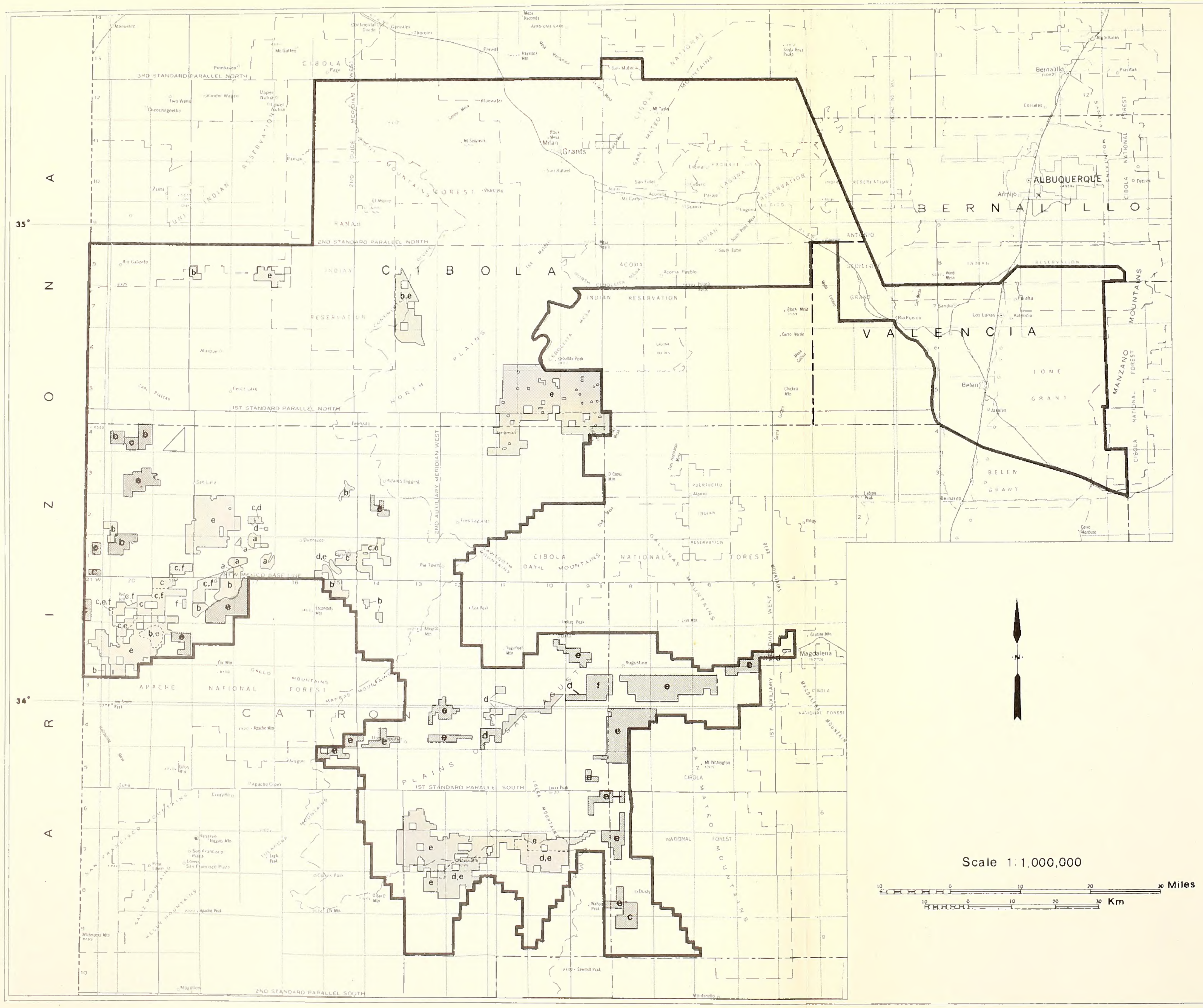
6) To enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources."

It is anticipated that all of the above objectives would be achieved to varying degrees by implementation of the Preferred Alternative. Changes in season-of-use, livestock distribution, change in class or kind of livestock, and adjustment of livestock numbers, in conjunction with rangeland improvements and vegetative land treatments, would enhance the quality of vegetation (Objective 6). Implementation of various design features would mitigate impacts of the Preferred Alternative, thus preserving important environmental elements (Objective 4), minimizing environmental harm (Objective 3), and protecting the surroundings (Objective 2). Subsequent increases in domestic livestock

U. S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
SOCORRO DISTRICT OFFICE
SAN AUGUSTINE RESOURCE AREA

WEST SOCORRO
RANGELAND MANAGEMENT PROGRAM
ENVIRONMENTAL IMPACT STATEMENT

MAP I-3. Vegetative Land Treatments under Alternative 4



━━ Divide Planning Area Boundary

LEGEND

▨ PROPOSED AREA FOR VEGETATIVE LAND TREATMENT(S)

a – Chaining Maintenance
b – PJ Control
c – Herbicide Spraying
d – Seeding
e – Prescribed Burning
f – Ripping, Pitting, Furrowing

Source: BLM Socorro District Planning/EIS Files

and wildlife numbers would help achieve a more productive balance between population and resource uses (Objectives 2 and 5). The result of implementing actions of the Preferred Alternative would be an environment that is improved in overall quality above the existing environment which would maintain public lands for use of succeeding generations (Objective 1).

Under the No Action Alternative, the rangeland would continue minor improvement. This improvement would ensure protection for future generations (Objectives 1 and 2) but would not attain the widest range of public benefit (Objectives 3, 4, and 5). The No Action Alternative would maintain the quality of vegetation (Objective 6) but would not achieve maximum attainable recycling of renewable resources.

Elimination of Livestock Grazing Alternative would ensure that vegetation would be available in perpetuity (Objective 1) for wildlife and other uses. Alternative 3 would also meet NEPA Objective 2 but would not meet NEPA Objectives 3 and 4 because a beneficial use of public land; i.e., livestock grazing, and a way of life would be eliminated. Eliminating livestock grazing would reduce the standard of living (Objective 5) of livestock operators who now graze livestock on public land and would not achieve the maximum attainable recycling of renewable resources (Objective 6).

Alternative 4 would improve the environmental quality (Objective 1) and provide for a productive surrounding (Objective 2). The Maximization of Livestock Forage Production Alternative would ultimately achieve full production potential of livestock forage within the DPA; however, it would not provide for the widest diversity or utilization of the vegetative resource (Objectives 3 and 4). This would, in turn, result in an unbalanced use of all resources (Objective 5) and detract from the long-term quality of all renewable resources within the DPA (Objective 6).

U.S. Forest Service (FS) - Portions of the Apache, Cibola, and Gila National Forests lie within the DPA. Coordination with the FS is required for all activity where BLM-administered public lands abut a national forest. The BLM currently operate under several Memoranda of Understanding (MOU). These agreements generally include: 1) blocking up of lands administered by both agencies through land exchanges, classifications, etc.; 2) development of recreation complexes on lands adjacent to each agency's jurisdiction; 3) range use agreements; 4) current timber appraisal data provided to BLM by the FS; 5) wildlife habitat management and predator activities and predator control where appropriate; and 6) fire protection and prevention. In addition, the Reserve Ranger District, the New Mexico State Department of Agriculture, the NMSLO, the BLM Socorro District Office, a livestock operator, and others have, pursuant to PRIA, developed an ESP. This program was developed to explore innovative grazing management systems and to provide incentive to the livestock operator whose stewardship results in an improvement of range condition of lands under permit. This program is available for review in the BLM Socorro District Office Planning/EIS files.

Bureau of Indian Affairs (BIA) - The BIA and BLM cooperate on land exchanges, classification, etc., involving lands administered by BIA. Through exchange agreements between BLM livestock operators and BIA, livestock forage is made available to these livestock operators. Also, both the FS and BLM participate in the Southwest Fire Fighter program.

U.S. Fish and Wildlife Service - The FWS is responsible for conducting predator and rodent control on public land when authorized by BLM. Livestock operators report instances of predation to FWS for documentation of livestock losses. All requests for predator control are incorporated into the BLM Socorro District Animal Damage Control Plan and its accompanying map which authorizes FWS to carry out a predator control program.

The livestock operator makes a request to FWS for rodent control on public land. Rodent control requests are then evaluated by BLM, FWS, NMDG&F, and New Mexico State Department of Agriculture to determine vegetative resource damages or the potential for health hazards. Rodent control on public land is authorized by BLM with a request to the FWS for control services.

Consultation with the FWS is required before any project initiated or approved by BLM is implemented that may affect any threatened, endangered, or sensitive plant or animal or their habitat. This consultation is required by Section 7 of the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531-1543) of 1973. Consultation may be formal or informal, depending on the degree of disturbance caused by the projects. This EIS is considered to be a major Federal project and BLM has requested from the FWS a synopsis of Federally-listed and proposed species that are or may be present within the DPA.

It should also be noted that the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.) requires consultation with the FWS and the NMDG&F when the waters of any stream or other water body are proposed or authorized to be impounded, diverted, channelized or otherwise controlled or modified by any Federal or private agency under Federal permit or license. This consultation shall be conducted with a view to preventing loss of or damage to wildlife resources in connection with the previously mentioned water development projects.

Soil Conservation Service and Agricultural Stabilization and Conservation Service (ASCS) - SCS and ASCS provide assistance to landowners who want to improve their private and State-leased land within their ranch boundaries. ASCS provides cost-sharing of fences, water developments, erosion control, and vegetative treatment projects while SCS provides technical assistance in planning, surveying, and designing these projects. SCS also assists landowners in developing plans for ranches on private, State, and intermingled land. The primary objective of these plans is to improve range condition and decrease soil erosion on State and private lands. SCS is involved with ranchers at their request.

U.S. Geological Survey (USGS) and Office of Surface Mining and Reclamation (OSM) - Surface disturbance associated with oil and gas, geothermal, and surface or underground mining activities would, to some minor degree, affect the implementation of the Preferred and other alternatives. The use and rehabilitation of these disturbed areas must be coordinated between BLM, USGS, and OSM.

Advisory Council on Historic Preservation - On January 14, 1980, the Rangeland PMOA between BLM and ACHP pertaining to the Federal livestock grazing and range management program was ratified by the Chairman of the Council. The PMOA simplifies procedures to be followed in grazing EIS's and subsequent related actions for compliance with Section 106 of the National Historic Preservation Act (80 Stat. 915, as amended; 16 U.S.C. 470-470b, 470c- 470n). The intent of the PMOA is to reduce involvement with the ACHP while requiring close coordination with SHPO. Generally, the Council's comments would be requested only when the SHPO and BLM cannot agree.

State Programs

Historic Preservation Bureau (SHPO) - The BLM cultural resource management program operates in accordance with 36 CFR, Part 800 (Procedures for Protection of Historic and Cultural Properties), which provides specific procedures for consultation between BLM and the SHPO. An MOU between the State of New Mexico and the BLM New Mexico State Office became effective March 4, 1982. This MOU coordinates the provisions of 36 CFR 800 with existing BLM procedures, emphasizing the BLM planning system. The MOU incorporates procedures for exchanging information with the SHPO concerning cultural resources on public land.

New Mexico Environmental Improvement Division (EID) - The EID, acting as staff to the New Mexico Water Quality Control Commission, has developed a Statewide water quality control management plan in response to Section 208 of the Federal Clean Water Act of 1977 (P.L. 95-217). This plan includes an assessment of non-point sources of sediment and recommends best management practices (BMPs) for controlling sediment from various land uses. BLM would consider the content of the BMPs during development of management systems. The broad objective is to improve the quality of runoff originating on public land. BLM Socorro District would also obtain permits from the EID as a prelude to conducting prescribed burning. Burns would be conducted in accordance with the provisions of such permit.

State Engineer - The State Engineer is the official responsible for determining water rights in the DPA. Stock tanks of less than 10 acre-feet capacity do not require a formal water right; however, a water right is required for livestock wells in all declared groundwater basins within the DPA. Water development associated with BLM grazing management would be coordinated with the State Engineer's Office to ensure compliance with applicable State regulations.

New Mexico Department of Game and Fish - A master MOU between the NMDG&F and USDI, BLM New Mexico State Office was signed on October 10, 1978, outlining the responsibilities of each agency in New Mexico. The major thrust of the MOU is that the NMDG&F is responsible for wildlife and BLM is responsible for habitat. Close coordination between the two agencies is necessary to protect and enhance the wildlife habitat within the DPA.

Another agreement between the two agencies refers to the coordination necessary before any vegetative land treatment projects are started. The BLM Socorro District would furnish the NMDG&F plans for any proposed vegetative treatment projects at least one year prior to the implementation of projects. The plans would include the method of treatment, the time frame of the projects, maps of the areas involved, and acreages.

Another agreement between NMDG&F, BLM, and FS provides for these agencies to develop and carry out wildlife resource management programs pursuant to the Sikes Act (74 Stat. 1052, as amended; 16 U.S.C. 670a-670o). These wildlife resource management programs would be addressed in comprehensive plans prepared by each agency for lands under their respective jurisdictions in the State.

In addition, consultation with the NMDG&F would be necessary to determine if the Preferred or any other alternative would affect any State listed threatened or endangered species or their habitat.

New Mexico State Heritage Program - Close coordination and consultation with the NMSHP would be necessary to determine if the construction of the proposed rangeland improvements and vegetative land treatments would affect any plant species of special State concern pursuant to BLM New Mexico State policy.

New Mexico State Land Office - The NMSLO, the New Mexico Department of Agriculture, and the BLM function under an MOU that facilitates an exchange of information, as well as consultation and advice regarding range management programs. BLM also consults with the NMSLO and the livestock operator when establishing livestock grazing capacity on intermingled State, private, and public lands.

New Mexico State Department of Agriculture - Close coordination between the BLM and New Mexico State Department of Agriculture would be necessary to ensure that New Mexico State laws concerning the use of herbicides are complied with prior to any proposed vegetative land treatments. The New Mexico State Department of Agriculture has officially commented on BLM's approach on the development of the West Socorro Rangeland Management Program Preferred Alternative. BLM has utilized these comments during development of this EIS. New Mexico State Department of Agriculture comments may be examined in the BLM Socorro District Planning/EIS files.

Department of Natural Resources, Division of Forestry (DF) - Under an agreement, the Socorro District DF and BLM Socorro District provide mutual fire assistance and BLM obtains timber and forest product appraisal information from the DF. The BLM Socorro District also coordinates fire management plans and prescribed burns with the DF to ensure a consolidated and consistent approach to vegetative management.

The BLM Socorro District Office currently functions under 51 MOUs, Memoranda of Agreements, and Cooperative Agreements with Federal, State, and local agencies that directly affect resource activity programs within the District. These may be examined in the BLM Socorro District Office Planning/EIS files.

State and Private Lands

State and private lands comprise 3,819,066 acres (63 percent) within the DPA. BLM, in consultation with private landowners and State lessees would influence the grazing (set grazing season, period of use, etc.) on unfenced intermingled private and State lands within allotments with AMPs.

BLM issues two types of authorizations for recognizing grazing capacity of privately controlled lands: exchange-of-use agreements and percentage Federal land permits. Exchange-of-use agreements may be issued to applicants owning or controlling non-public lands that are interspersed with and normally grazed in conjunction with public land, not to exceed the livestock grazing capacity of the non-public lands. Percentage Federal land permits are issued and generally restricted to allotments that are used and controlled by one operator. After the grazing capacity of all lands within the allotment is determined, the livestock operator would be billed only for the grazing use on the public land, not to exceed the capacity of public lands.

IMPACTS

A summary of environmental impacts of the Preferred Alternative and each alternative, as discussed in Chapter III, is illustrated in comparative form in Table I-5. This table outlines the issues and provides a basis for public review and for making a choice among options by decision makers.

TABLE I-5

COMPARISON OF IMPACTS OF THE ALTERNATIVES

Resource	Existing	Preferred Alternative		No Action Alternative		Elimination of Grzg.		Maximization Lvstck. Forage Prod.	
		Short Term	Long Term	Short Term	Long Term	Short Term	Long Term	Short Term	Long Term
Physical Setting	Stable	NS	NS	NS	NS	NS	NS	NS	NS
Vegetation									
Pounds of Air Dry Matter in Current Years Production (Millions of Pounds)	253.8	309.6	403.2	257.0	261.0	340.2	486.0	340.2	486.0
Ecological Condition Class (Acres)1/									
Excellent	1,892	33,669	86,664	4,991	9,905	34,519	91,519	65,293	168,123
Good	441,436	468,756	493,847	441,557	449,252	494,860	541,627	464,086	465,152
Fair	446,859	390,462	315,070	440,947	431,801	363,507	262,306	363,507	262,306
Poor	8,948	6,249	3,554	8,639	8,176	6,249	3,554	6,249	3,554
Soils									
Percent Change in Sediment Yield	<0.2 Ac. Ft./mi²/ Yr. class2/ (Stable)	+3	-8	0	0	0	-11	+4	-5
Wildlife (Numbers)									
Deer	2,200	2,200	4,500	2,200	2,200	2,200	4,500	2,200	4,500
Antelope	600	600	1,600	600	600	600	1,600	600	1,600
Elk	5	5	100	5	5	5	100	5	100
Wildlife AUMs	3,759	4,758	9,949	4,758	4,758	3/	3/	4,758	9,949
Estimated Overall Change in Standard Habitat Sites	E	NS+	NQ+	NC	NC	NQ+	NQ+	NQ+	NQ+
Livestock Grazing/Mgmt.									
No. of Livestock Operators	156	156	156	156	156	0	0	156	156
Domestic Livestock Forage Allocation (AUMs)	141,600	157,000	178,200	143,000	145,000	0	0	186,000	250,000
Water Resources									
Water Use (Ac. ft./Yr.)	2,369	2,890	3,764	2,400	2,436	0	0	3,176	4,537
Decrease in Runoff (%)	NC	NC	21	NC	NC	NC	19	NC	13

TABLE I-5 (continued)

COMPARISON OF IMPACTS OF THE ALTERNATIVES

Resource	Existing	Preferred Alternative Short Term	Preferred Alternative Long Term	No Action Alternative Short Term	No Action Alternative Long Term	Elimination of Grzg. Short Term	Elimination of Grzg. Long Term	Maximization Lvstck. Forage Prod. Short Term	Maximization Lvstck. Forage Prod. Long Term
Air Quality	Stable	Local Dust Increase	NC	NC	NC	Dust Decrease	Dust Decrease	Local Dust Increase	NC
Cultural Resources	NK	NQ	NQ	NQ	NQ	+	+	NQ	NQ
Visual Resources	Stable	NS-	NS+	NC	NC	NS+	NS+	NS-	NS
Wilderness	Stable	NS-	NS-	NS-	NS-	NS+	NS+	NS-	NS-
Recreation									
Deer Hunting (Visitor Days)	4,164	4,180	8,550	4,180	4,180	4,180	8,550	4,180	8,550
Social Conditions	*	*	*	*	*	*	*	*	*
Economic Conditions ($)									
Livestock Sales	8,637,870	8,800,348	9,023,464	8,652,813	8,673,717	7,169,432	7,169,432	9,103,710	9,768,567
Cash Costs	3,373,272	3,436,723	3,523,854	3,379,107	3,387,271	2,799,815	2,799,815	3,555,192	3,814,833
Net Cash Sales	5,264,598	5,363,625	5,499,610	5,273,706	5,286,446	4,369,617	4,369,617	5,548,518	5,953,734
Depreciation	1,007,274	1,026,220	1,052,238	1,009,016	1,011,454	836,037	836,037	1,061,596	1,139,126
SUBTOTAL NET INCOME -	4,257,324	4,337,405	4,447,372	4,264,690	4,274,992	3,533,580	3,533,580	4,486,922	4,814,608
Other Costs	3,561,918	3,628,917	3,720,922	3,568,080	3,576,699	2,956,391	2,956,391	3,754,012	4,028,173
TOTAL NET INCOME -	695,406	708,488	726,450	696,610	698,293	577,189	577,189	732,910	786,435
Mule Deer Visitor Day Direct Income Value	313,549	314,754	1,037,799	314,754	504,368	314,754	1,037,799	314,754	1,037,799

1/ Resultant from implementing management actions (does not include vegetative land treatments).

2/ The existing weighted average value for sediment yield is actually borderline to the slight class (0.2 - 0.5 acre-feet per square mile per year).

3/ All forage available for wildlife.

NK	Not Known
NQ	Non-Quantifiable
NS	Not Significant
NC	No Change from Existing (Changes Not Quantifiable)
E	Existing Value
I	Increased Value
+	Beneficial
-	Adverse
*	See Table III-7 for Assessment of Social Change by Alternative.

Short-term/Long-term (see Glossary or Chapter III for definition).

Source: BLM Socorro District Planning/EIS Files.

CHAPTER II

AFFECTED ENVIRONMENT

INTRODUCTION

This Chapter describes the environmental components of the Divide Planning Area (DPA) that would be affected by implementation of the Preferred Alternative or one of the other three alternatives under consideration. Components of this Chapter include: climate, air quality, geology and minerals, topography, soils, water resources, vegetation, wildlife, livestock grazing, cultural resources, visual resources, wilderness, recreation, other land uses, areas of critical environmental concern (ACEC), social conditions, and economic conditions.

Descriptions of these components are only as detailed as is necessary to understand the effects of the alternative(s). Consequently, where anticipated impacts to certain resources, or their uses, would be negligible, descriptions are correspondingly brief.

More detailed descriptions of resources and resource uses in the DPA are found in the Bureau of Land Management (BLM) Socorro District Cebolleta Unit Resource Analysis (URA) 1969, Pelona URA 1973, Quemado URA 1973, Driveway URA 1974, El Malpais URA 1978, Divide URA 1980, Ladron Planning Area Analysis (PAA) 1976, Divide PAA 1980, and the Socio-Economic Profile Analysis for West-Central New Mexico (Gray et al. 1977). These documents are permanently retained and are available for public review in the BLM Socorro District Planning/Environmental Impact Statement (EIS) files, 198 Neel Avenue, Socorro, New Mexico 87801.

CLIMATE

The DPA lies almost entirely within the southwestern mountain climatic region. In this region, most elevations are greater than 7,000 feet. Frosts begin between September 10 in the west and October 20 in the southwest. Last frosts occur from May 10 in the southwest to June 20 in the highest elevations. The average frost-free period is 100 days and ranges from 80 days in the west to 180 days in the easternmost areas. The mean annual maximum temperature of the area is 66.6 degrees F. The mean annual minimum temperature is 34.5 degrees F. The growing season mean temperature is 53 to 71 degrees F.

Precipitation occurs in the DPA mainly in summer with moisture arriving from the Gulf of Mexico in the form of localized, high intensity, short duration thunderstorms. Average annual precipitation varies from 9 to 14 inches. During the growing season precipitation averages 7 inches and varies from a maximum of 15 inches to a minimum of 3.5 inches (Climate and Dispersion Meteorology of BLM Lands In New Mexico 1978).

Wind speeds are usually moderate but strong winds often exceeding 30 mph and reaching peaks of 50 mph or more accompany fronts in late winter and spring. Blowing dust and soil erosion can be problems during dry periods. Temperature inversions can cause problems by preventing upward mixing of near surface atmospheric pollutants; i.e., smoke, fumes, etc.

AIR QUALITY

The air quality of the DPA is very good as the area is sparsely populated and, for the most part, undeveloped with population centers being not large enough to generate signficant amounts of air pollutants. Also, there are no major industries or factories within the area. The only source of air pollution in the DPA is particulate matter generated from intermittent dust storms. Pollution levels due to dust are not known, however, and at present are not considered to detract from the good air quality of the DPA.

GEOLOGY AND MINERALS

Some of the major structural units within the DPA are: The Zuni Uplift; the Gallup Embayment; the Acoma Embayment and the Mogollon Slope. The major portion of the DPA is located within the Mogollon Slope. A prominent feature of the Mogollon Slope is the large, enclosed alluvium-filled basin known as the San Augustine Plains. It is surrounded by hills and mountains of volcanic origin. The basin was once occupied by an ancient lake, as indicated by shore features present at the southern end of the hills south of Horse Springs.

Sedimentary rocks within the DPA are of late Paleozoic, Mesozoic and Cenozoic Ages. They consist of a variety of marine and non-marine formations originating during the emergence of the seas and submergence of the land. Many of these formations are overlain by recent volcanic rocks of Tertiary and Quaternary Age. The primary structures of the volcanic formations are still evident. Examples of these volcanic features are: El Malpais, Chain of Craters, Horse and Pelona Mountains, and Red Hill Cone.

The mineral resources within the DPA include a potential for oil and gas within the Gallup and Acoma Embayments; geothermal energy associated with recent volcanic activity; deposits of coal within the Cretaceous formations; sandstone-type uranium and hydrothermal tin deposits. There are also abundant mineral materials such as cinders and pumice, clay, stone, basalt, and sand and gravel.

TOPOGRAPHY

The DPA is located in the Navajo and the Datil sections of the Colorado Plateau physiographic province. The area is characterized by extensive flat areas (San Augustine Plains and the North Plains). There are numerous mountain ranges which were formed from volcanic activity. Where sedimentary rocks predominate, the landscape consists of mesas and buttes causing a well-developed bench and slope topography.

The elevation within the DPA ranges between 6,000 feet at Hubbell Draw to 11,389 feet at Mt. Taylor. The Continental Divide bisects the DPA by following some of the major mountains within the area (Chain of Craters, Sawtooth Mountains, and Pelona Mountain). Principal mountain ranges which surround the area are: San Mateo, Datil, Zuni, Mangas, Magdalena, and Tularosa Mountains, the Black Range and Mt. Taylor.

SOILS

Three separate soil surveys were conducted through a cooperative effort of the Soil Conservation Service (SCS) and BLM. Soil types were inventoried within the DPA and interpretive data about the representative soils were gathered. These data were compiled in soil surveys of Catron (field work completed 1981), Socorro (field work still in progress), and Cibola (field work still in progress) Counties. They are all unpublished surveys pending final correlation, and show that the soils were formed from a variety of geologic materials consisting dominantly of basalt, sandstone, shale, and rhyolite. The area in the San Augustine Plains is dominated by deep alluvial soils of mixed mineralogy. Data concerning these surveys is available at the BLM Socorro District Office and the SCS Field Office in Socorro.

Table A-1 in Appendix A displays the soil mapping units, general soil groups, and physical parameters of the soils in the DPA. The general soil groups include soils that are geographically associated, are on similar landscapes, have similar geology, and generally have similar soil properties (Map A-1 in Appendix A displays soils in the DPA by general soil groups).

Twenty-four Section 15 allotments involving 42,292 acres of Public land in the Malpais Planning Unit have not been inventoried. Table A-2 displays similar information as Table A-1 (both in Appendix A) for the soils that have not been inventoried. These soils are represented on Map A-1 in Appendix A by letters rather than numerals.

Water Erosion

A soil's susceptibility to erosion is predominately determined by the factors of slope, permeability, restrictive layers, coarse fragments, soil texture, vegetative cover, and climate. Tables A-1 and A-2 in Appendix A display many of the soil characteristics which relate to its erosion susceptibility.

Sediment yields by general soil groups are presented in Table II-1. Sediment yield classes are based on the Pacific Southwest Inter-Agency Committee (PSIAC) Method (1968) for estimating sediment yields (Appendix A). PSIAC sediment yield values are relative figures only and were not developed as actual measurements of sediment yield. They indicate a relative range of values and are considered valid for identifying trends.

Most of the soils in the DPA have relatively low sediment yields. Most of the soils, 58 percent, are in the stable class; 41 percent are in the slight class. Sediment yield classes are displayed in Table A-1 in Appendix A for each soil mapping unit in the DPA. Only 1 percent of the area is in the moderate class and it is composed of Celacy, Orthents, Mion, and Catman soils. There may be small discontinuous areas that are in the critical or severe sediment yield classes, but they are too small to feasibly sample.

TABLE II-1

EXISTING SEDIMENT YIELD BY GENERAL SOIL GROUP

General Soil Group[1]	Public Land (Acres)	PSIAC Sediment Yield Class[2]	Estimated Sediment Yield (ac. ft./sq. mi./yr.)
1	68,810	4	0.2 - 0.5
2	184,730	5	<0.2
3	166,527	4	0.2 - 0.5
4	42,620	4	0.2 - 0.5
5	49,060	5	<0.2
6	43,371	4	0.2 - 0.5
7	21,482	5	<0.2
8	51,080	5	<0.2
9	113,409	5	<0.2
10	25,591	4	0.2 - 0.5
11	50,836	5	<0.2
12	24,770	4	0.2 - 0.5
13	29,497	5	<0.2
14	613	5	<0.2
15	9,646	5	<0.2
16	8,720	5	<0.2
17	25,432	5	<0.2
18	11,961	5	<0.2
19	1,974	5	<0.2
TOTAL[3]	930,129		

1/ For definition of general soil group see Glossary.

2/ 4 = slight
5 = stable

3/ Does not include 42,292 acres in the Malpais Planning Unit or 13,671 acres of unallotted public land.

Source - BLM Socorro District Planning/EIS Files

Existing sediment yields on the 42,292 acres of public land in two areas of the Malpais Planning Unit (one near Grants and one north of Fence Lake) could be no worse than 3.0 acre-feet/square mile/year (Appendix A). This worst possibility would occur only if all the ground were bare, utilization were 100 percent, Soil Surface Factors (SSFs) were 100, soils had active headcuts and degradation in tributary channels, and banks were eroding continuously or at frequent intervals. The possibility that this is the case is very slight. Soils on the unallotted public lands have similar sediment yields as the rest of the public land in the DPA.

Wind Erosion

A soil's susceptibility to wind erosion is determined primarily by the surface texture, percent calcium carbonate, and moisture content of the soil. Soils are placed in various wind erodibility groups (WEGs) based on their susceptibility to wind erosion (Tables A-1, A-2, and Appendix A Methodology for Determining WEGs).

Soils with sandy surfaces and few or no coarse fragments on the surface are the most susceptible to wind erosion. These soils include Royosa, Telescope, Pinavetes, Flugle, Datil, and Celacy (Refer to Tables A-1 and A-2 in Appendix A for more information on WEGs). Approximately 10 percent of the DPA has a very high soil blowing hazard, 47 percent high, 28 percent moderate, and 15 percent slight.

WATER RESOURCES

Surface Water

The DPA lies within three principal drainage areas; the Rio Grande Basin, the Lower Colorado River Basin, and the Western Closed Basins (Map II-1). The Western Closed Basins contain 23 percent of the DPA. As closed basins, runoff or sediment is not transferred out of the system. Mean annual surface water supply by drainage basins is shown in Table II-2. The Rio Grande is the major perennial river in the Rio Grande Basin although it is located about 20 miles east of the DPA boundary. The main ephemeral tributaries of the Rio Grande, which are within the DPA boundaries and the Rio Grande Basin, are the Rio San Jose, Rio Salado, and the Rio Puerco.

TABLE II-2

MEAN ANNUAL SURFACE WATER SUPPLY BY DRAINAGE BASINS WITHIN THE DIVIDE PLANNING AREA

Basin	Runoff in Inches	Area in Acres[1/]	Annual Yield Ac. Ft.
North Plains Closed Basin	0.5	575,235	23,968
San Augustine Closed Basin	0.5	804,242	33,510
Lower Colorado River Basin	0.5	1,641,553	68,398
Rio Grande Basin	0.5	3,018,489	125,770

1/ Acreage figures include private, State and Federal ownership.

Source: BLM Socorro District Planning/EIS Files.

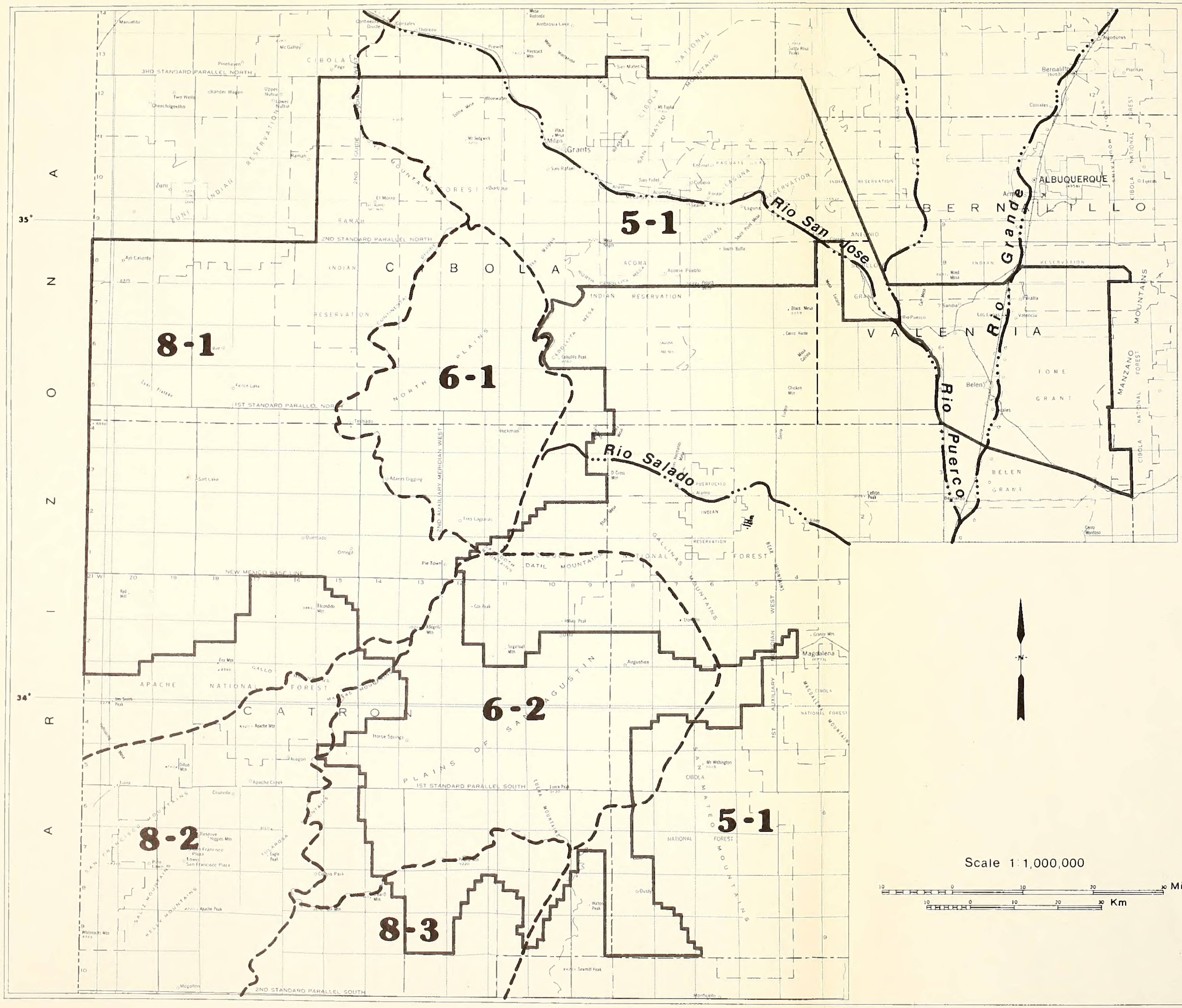
Flow within major streams and their tributaries comes after storm events and exhibits strong seasonal trends. The Rio Puerco and Rio Salado experience 64 percent and 88 percent, respectively, of their total annual runoff in the summer months. The average annual discharge (1941-79) recorded for the Rio Puerco at Bernardo is 47.2 cfs, with a maximum recorded discharge of 18,000 cfs in 1941. Average annual discharge for the Rio Salado at San Acacia (32-year average) is 14.9 cfs, with a maximum recorded discharge of 36,200 cfs in 1965. In the Lower Colorado River Basin the average annual discharge (1953-72) for the San Francisco is 25.9 cfs, with a maximum recorded discharge of 11,900 cfs in 1972 near Reserve, New Mexico. Average annual discharge for the Gila River is 129 cfs, with a maximum discharge of 58,700 cfs recorded in 1978 below Blue Creek (USGS 1979). At this time due to no historic data and no permanent gaging stations, surface runoff in the Western Closed Basins is estimated to average 0.1 inches annually, or 5 acre-feet per square mile (Western Closed Basins Plan 1974).

Surface water quality in the Rio Grande Basin is extremely variable due to high evaporation rates and leaching of salts and other solids. Mean chloride levels are not in excess of Environmental Protection Agency (EPA) and the State of New Mexico recommended standards in the Rio Puerco and Rio Salado, but sulfate averages have exceeded standards in the Rio Puerco. Average annual sediment yield for the Rio Salado near San Acacia, New Mexico is 840 acre-feet, and 5,584 acre-feet for the Rio Puerco near Bernardo, New Mexico (Middle Rio Grande Basin Plan 1976). Most of the water from these two rivers is suitable for stock and wildlife but unsuitable for human consumption due to the unpalatable taste and laxative effect caused by the high salt content. In the Lower Colorado Basin, perennial streams contain water of existing quality suitable for stock and wildlife. Total dissolved solids data (1951-70) average 234 mg/l for the Gila River and 275 mg/l for the San Francisco River (Lower Colorado Basin Plan 1974). These two rivers have the fewest tons of suspended sediment per square mile in the State. There are no data available on surface water quality or type and quantity of sediments in the Western Closed Basins due to the ephemeral nature of the streams and their location in remote, undeveloped areas; however, the Malpais lava field within the North Plains Closed Basin has an erosion value near zero which indicates very low sediment production. Federal criteria and State Water Quality Standards For Interstate and Intrastate Streams within the Divide Planning Area are shown in Appendix B.

Groundwater

The DPA includes parts of the Bluewater, Rio Grande, and Gila-San Francisco underground water basins which have been declared by the New Mexico State Engineer (Map II-2). Before drilling a well in any of these basins, an application to appropriate water must be filed with the State Engineer.

Groundwater in the DPA is mainly distributed in Quaternary age sand and gravel aquifers, Triassic age sandstones, and Permian age limestones and sandstones. Aquifer yields in the DPA are extremely variable and



U. S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
SOCORRO DISTRICT OFFICE
SAN AUGUSTINE RESOURCE AREA

WEST SOCORRO
RANGELAND MANAGEMENT PROGRAM
ENVIRONMENTAL IMPACT STATEMENT

MAP II-1. Surface-Water Drainage Basins

Divide Planning Area Boundary

LEGEND

RIO GRANDE BASIN

5-1 Rio Grande

LOWER COLORADO RIVER BASIN

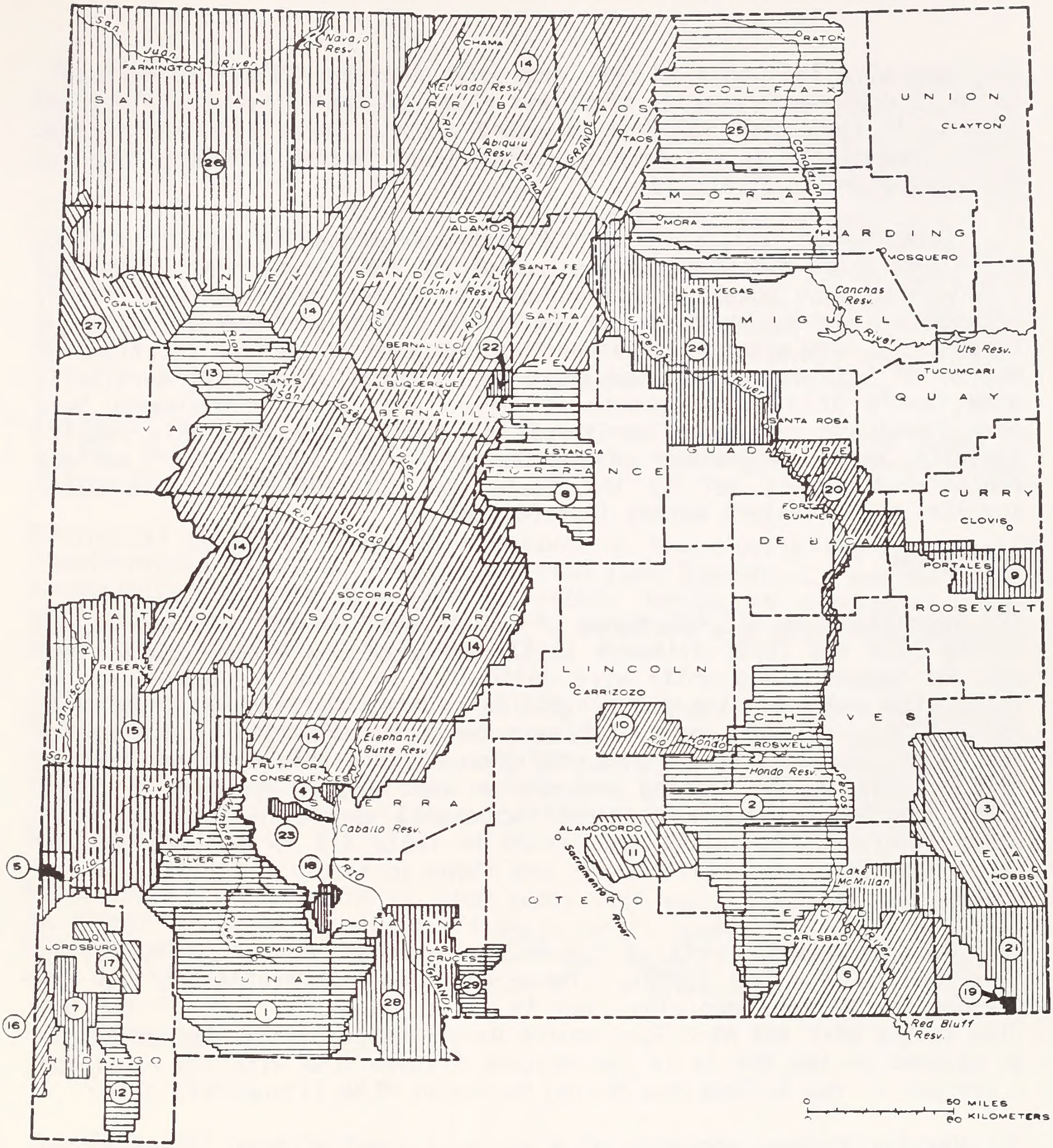
8-1 Little Colorado River
8-2 San Francisco River
8-3 Gila River

WESTERN CLOSED BASIN

6-1 North Plains
6-2 San Augustine Plains

Sources: New Mexico State Engineer 1980,
BLM Socorro District Planning/EIS Files

Map II-2
DECLARED UNDERGROUND WATER-BASINS IN NEW MEXICO



BASIN	AREA IN SQUARE MI.
1. MIMBRES VALLEY	4,279
2. ROSWELL	4,281
3. LEA COUNTY	2,160
4. HOT SPRINGS	38
5. VIRDEN VALLEY	19
6. CARLSBAD	1,965
7. ANIMAS	426
8. ESTANCIA	1,724
9. PORTALES	628
10. HONDO	611
11. PEÑASCO	723
12. PLAYAS VALLEY	515
13. BLUEWATER	1,318
14. RIO GRANDE	26,209
15. GILA - SAN FRANCISCO	5,659
16. SAN SIMON	263
17. LORDSBURG VALLEY	329
18. NUTT - HOCKETT	133
19. JAL	16
20. FORT SUMNER	1,059
21. CAPITAN	1,550
22. SANDIA	73
23. LAS ANIMAS CREEK	75
24. UPPER PECOS	2,708
25. CANADIAN RIVER	5,826
26. SAN JUAN	9,727
27. GALLUP	1,439
28. LOWER RIO GRANDE	1,685
29. HUECO	255
TOTAL	75,611

Source: New Mexico State Engineer

are generally less than 10 GPM, but sufficient for livestock purposes. Depth to groundwater varies from less than 200 feet in most valleys and plains, to more than 500 feet in other areas. Areas in which igneous rocks predominate do not transmit significant amounts of water and are not considered as an aquifer.

Groundwater quality in the DPA ranges from good to poor. In a few wells the total dissolved solids exceed the EPA recommended maximum of 1,000 mg/l for potable water; but since for the most part only groundwater can be found in the DPA, it is used for livestock watering purposes. Some groundwater is hard but depends on aquifer location for degree of hardness. Isolated examples of groundwater with marginally high levels of iron, manganese, sulfate, and other contaminants have been found and are being monitored and studied, but analysis results indicate most groundwater from the DPA does not exceed maximum contaminant levels set by the State and the EPA for public water supplies and livestock waters (Appendix B).

VEGETATION

The vegetation on 972,421 acres of public land in the DPA was mapped during 1978 and 1979; although 13,671 acres of unallotted public land was not mapped. Map units were delineated by using a combination of range site and condition class. SCS Range Site Descriptions (SCS 1977, 1978, 1980, and 1981) were used as a basis for classifying and naming the range sites and estimating condition class within each range site. Methods used in the mapping process are outlined in Appendix C; major plant species (common and scientific names) and their occurrence by range site/condition class are listed in Table C-1 in Appendix C, and the range sites/condition classes are shown in Visual B (located in map pocket).

The DPA lies within parts of two Major Land Resource Areas (MLRAs) as described by the SCS (1980). These are the Western Plateau and the Arizona/New Mexico Mountains; and in these two MLRAs most of the DPA lies in the WP-2 and AN-2 Subresource Areas, respectively. Approximately 96 percent of the DPA is in the Western Plateau MLRA with the remaining 4 percent in the Arizona/New Mexico Mountains MLRA (Visual B).

The Western Plateau consists of broad mesas and plateaus interspersed with numerous deep canyons and dry washes, mesa-breaks, and canyon walls. Scattered throughout the region are isolated volcanic peaks, cones, and lava flows. There are two large closed basins: the San Augustine Plains and the North Plains. Elevations vary from 6,000 to 7,800 feet and average annual precipitation varies from 10 to 16 inches. The soils and climate in the DPA contribute to a grassland and mixed shrubland plant community. At upper elevational ranges are pinyon-juniper woodlands characterized by alligator juniper, oneseed juniper, shrub liveoak, bullgrass, little bluestem, pinyon ricegrass, and blue grama. The grass-dominated lands occur on the deeper soils on relatively level to gently rolling terrain. They are characterized by western wheatgrass, spike muhly, blue grama, and galleta. On shallow or stony soils occurring on steeper slopes, juniper and pinyon pine become components of the plant communities.

The Arizona and New Mexico Mountains MLRA contains valleys and high plateaus in the west-central part of the state which includes the Zuni, San Mateo, Datil, Gallo, and Mangas Mountains. Topography, strongly sloping to precipitous in the mountains, is gently to moderately sloping in the valleys and on the plateaus. Elevation varies from 6,000 to 11,389 feet and average annual precipitation varies between 16 and 25 inches. Higher elevations are dominated by Engelmann spruce, white fir, Douglas fir, and aspen. Intermediate and lower elevations have ponderosa pine, pinyon pine, Rocky Mountain juniper, alligator juniper, oaks, mountain mahogany, big bluestem, little bluestem, mountain brome, mountain muhly, New Mexico muhly, Arizona fescue, Letterman needlegrass, prairie junegrass, muttongrass, pine dropseed, and blue grama.

Potential herbage production for the 33 range sites in the area is listed in Table II-3 and acreages for the range site/condition class categories appear in Table II-4.

Ecological condition class is a measure of how closely the area under consideration resembles climax condition (see Appendix C) and does not necessarily indicate how much livestock forage is currently being produced. As a general rule, however, excellent and good areas produce more forage than fair or poor areas.

Information relative to trend on allotments without Allotment Management Plans (AMPs) is not available for the DPA. Trend studies have been in effect and studied for approximately 10 to 14 years on allotments in the Planning Area that have been under AMPs. These studies generally indicate static or improving trends. Specific data is on file at the BLM Socorro District Office.

Following is a discussion of each range site and its plant communities at climax and other ecological stages, as it appears in the SCS Range Site Descriptions, Section II E, Technical Guide. Appendix C contains more detailed information on presence of plant species.

Range Sites-Western Plateau

Loamy Plains

This site is relatively level to gently sloping with an occasional swale. The Loamy Plains site usually occurs on mesas, plateaus, and upland valleys with elevations varying from 6,400 to 7,200 feet. Soils are moderately deep to deep and well drained with a surface layer of medium textured loams and very fine sandy loams. The substratum is fine to moderately coarse textured; water-holding capacity is high to moderately high; and permeability is moderate to moderately slow. As vegetative cover deteriorates, permeability is reduced.

This is a grassland site, with lesser amounts of shrubs, half-shrubs, cacti, perennial forbs and annual forbs. Sagebrush occurs in higher concentrations on the upper slopes, often times as an understory shrub with invading juniper trees. Annual forbs occur in relative abundance during spring and summer months in years of above average growing conditions. When the potential plant community deteriorates,

TABLE II-3

POTENTIAL HERBAGE PRODUCTION BY RANGE SITE (LBS. PER ACRE AIR DRY)

Range Site	Production Favorable Years	Median Years	Unfavorable Years
WESTERN PLATEAU			
Loamy Plains	1,000	600	350
Shallow Hills	700	500	300
Sandy Slopes	900	600	300
Flood Plain	4,000	3,000	2,000
Meadow	4,000	3,000	2,500
Basalt Hills	1,350	975	475
Malpais	1,100	800	300
Loamy	950	663	375
Sandy	850	588	325
Gravelly	900	625	350
Deep Sand	900	588	275
Shallow	850	575	300
Cinder	875	613	350
Bottomland	3,000	2,100	1,200
Clayey Bottomland	3,200	2,225	1,250
Swale	1,350	975	600
Shallow Sandstone	700	488	275
Sandstone Hills	625	413	200
Limestone Hills	850	600	350
Hills	900	638	375
Salt Flats	1,500	1,025	550
Savannah	875	588	300
ARIZONA AND NEW MEXICO MOUNTAINS			
Pine Grassland	1,350	1,113	875
Mountain Malpais	1,050	850	650
Stony Loam	1,150	963	775
Mountain Upland	1,200	975	750
Shallow Hills	1,000	800	600
Mountain Breaks	950	763	575
Mountain Swale	2,000	1,750	1,500
Shallow Savannah	1,000	813	625
Basalt Hills	1,050	850	650
Rocky Mountain Malpais	1,200	800	400
Rocky Mountain Loam	800	550	300

Source: Soil Conservation Service Range Site Descriptions

TABLE II-4

ACRES FOR EACH ECOLOGICAL CONDITION CLASS* BY RANGE SITE

Range Site	Ecological Condition			
	Excellent	Good	Fair	Poor
WESTERN PLATEAU				
Loamy Plains	0	295	0	0
Shallow Hills	0	0	89	0
Sandy Slopes	0	0	1,253	0
Flood Plain	43	16,442	1,050	96
Meadow	0	0	0**	0
Basalt Hills	0	14,533	33,812	0
Malpais	0	22,224	76,776	141
Loamy	311	80,511	148,536	1,907
Sandy	0	12,066	26,692	135
Gravelly	0	11,341	662	0
Deep Sand	0	258	1,192	28
Shallow	0	2,511	556	0
Cinder	0	8,663	2,606	0
Bottomland	0	2,968	1,935	45
Clayey Bottomland	0	375	553	0
Swale	0	7,137	10,732	2,258
Shallow Sandstone	0	21,180	6,644	0
Sandstone Hills	0	64,574	4,919	0
Limestone Hills	0	1,428	158	0
Hills	371	25,621	35,138	3,206
Salt Flats	15	2,889	1,153	558
Savannah	124	61,646	8,322	0
ARIZONA AND NEW MEXICO MOUNTAINS				
Pine Grassland	0	0	305	0
Mountain Malpais	0	901	6,740	0
Stony Loam	0	266	30,523	0
Mountain Upland	1,028	15,783	13,216	0
Shallow Hills	0	0	440	0
Mountain Breaks	0	0	115	574
Mountain Swale	0	734	4,553	0
Shallow Savannah	0	2,020	64	0
Basalt Hills	0	14,754	6,068	0
Rocky Mountain Malpais	0	34,016	2,950	0
Rocky Mountain Loam	0	16,300	19,107	0
TOTAL -	1,892	441,436	446,859	8,948

* 73,286 additional acres were classified in non-range sites.
** There are no public land acres in this range site.

Source: BLM Socorro District Inventory Data, 1979 there is a marked increase in amounts of shrubs, half-shrubs, and forbs, with sagebrush often dominating the site.

Shallow Hills

This upland site occupies knolls, ridges, and moderately sloping plains. Slopes vary from 8 to 30 percent, while elevations vary from 6,200 to 7,500 feet. Occasional drainageways are associated with this site. This site occurs on all exposures without significant influence on the vegetation.

The soils associated with this site are generally shallow to very shallow over sandstone and shale. Surface textures are typically sandy loams, gravelly fine sandy loams, very fine sandy loams, or loams which also may be cobbly or stony. There are frequently sandstone rock and shale badlands associated with this site. Water intake rates are moderately rapid to rapid, and the water-holding capacity is low.

This range site consists of a sparse stand of pinyon pine and juniper trees with understory grasses, shrubs and forbs. Annual forbs are relatively abundant during spring and summer months in years of above average growing conditions. When the natural plant community deteriorates, there is a marked increase in amounts of pinyon pine and juniper trees. They may completely dominate the site. There is also an increase in shrubs, particularly sagebrush, and a marked decrease in relative abundance of palatable grasses. Cholla, pricklypear, sagebrush, and broom snakeweed may dominate the understory vegetation in severe deterioration of the natural plant community.

Additional plants which may occur on this site in varying amounts, dependent on current growing conditions, are: Spanish dagger, gooseberry current, broom snakeweed, Palmer penstemon, yellow wall-flower, oakbrush, Utah serviceberry, larkspur, lupine, pricklypear cacti, cholla cacti, Russian thistle, threeawns spp. annual bromes, pale wolfberry, bull thistle, and wooly Indian-wheat.

Sandy Slopes

This site occurs on mesas, plateaus, and valley side slopes. Slopes vary from level to gently sloping on undulating upland plains and are generally less than 10 percent. Elevations vary from 6,400 to 7,200 feet.

The soils on this site are deep and well drained. The surface layer is a sandy loam, sandy clay loam, or fine sandy loam. The subsoil and substratum or underlying layer is usually a sandy loam, fine sandy loam, or sandy clay loam. Water intake is rapid to moderately rapid. Available water-holding capacity ranges from 4.8 to 6.8 inches in a 60-inch profile.

The plant community is characterized by a grass-shrub mixture with a few scattered pinyon pine and juniper trees. Annual forbs occur in relative abundance during spring and summer months in years of above average growing conditions. When the potential plant community deteriorates, there is a marked increase in the abundance of shrubs, half-shrubs, and trees. In drastic deterioration, the site may be dominated by sagebrush, pinyon pine, juniper, forbs, and cacti, with a small amount of desirable grasses.

Flood Plain

This site occurs in valley bottoms and floodplain positions, including swales, which receive periodic inundation from flood waters. Slopes vary from approximately 3 to 5 percent, while elevations vary from 6,200 to 7,200 feet.

The soils which support the vegetation on this site are fine, medium textured to moderately coarse loams, silty clay loams, fine sandy loams, and clay loams. They are deep and have a moderate and slow intake rate. Permeability is moderate and water-holding capacity is moderately high.

This grassland plant community is dominated by western wheatgrass and alkali sacaton with lesser amounts of annual and perennial forbs. Only a very small amount of shrubs are present. When the plant community deteriorates, annual forbs and grasses become quite common. This site may be completely destroyed by water erosion and may form deep, vertical-walled gullies and drain the flood waters from the site.

Meadow

This range site is not found on any public lands within the DPA.

Basalt Hills

The topography of this site varies from moderately steep to steep. Slopes generally exceed 15 percent and may average 40 percent. Basaltic rocks and sometimes boulders and outcrops are often present in large numbers or amounts. Elevations vary from approximately 5,000 to 7,500 feet.

Characteristically, surface textures are stony clay loams, stony loams, cobbly loams, or cobbly clay loams. The soils are very shallow to moderately deep over basalt, or deep but stony throughout. Soil, plant, and moisture relationships are good, and soil temperatures may be slightly warmer than those of surrounding soils due to darker color. Water-holding capacity is low to moderate, while permeability is moderate to moderately slow.

This site is dominated by perennial grasses, such as black grama, sideoats grama, blue grama, green sprangletop, and New Mexico feather-grass. Shrubs and half-shrubs may include Apache-plume, winterfat, Bigelow sagebrush, yerba-de-pasmo, skunkbush sumac, juniper, and shrub liveoak. Species of buckwheat are frequently the dominant forbs. Continuous yearlong grazing over long periods may cause a decline or disappearance of cool-season grasses and preferred browse plants. If grazing use is heavy and prolonged, plants such as black grama, sideoats grama, and little bluestem also decrease. Substantial increases in tobosa or galleta, curly mesquite, threeawns, juniper, and oakbrush generally characterize retrogression.

Malpais

Topography of this site is nearly level to moderately sloping, with slopes varying to 15 percent. The terrain may frequently be interrupted by basalt outcrops, rocks, or boulders. This range site occurs as lava flows, usually across broad areas and over uniform slopes. Low hills, narrow breaks, or knobs may, however, break this uniformity in slope, as may dissecting arroyos and potholes. Elevations vary from approximately 5,000 to 7,500 feet.

Surface textures of the soils vary from stony clay loams, stony fine sandy loams, and stony loams to cobbly fine sandy loams and cobbly loams. They are very shallow to moderately deep over basalt and may be calcareous in the surface or subsoil. Subsoils are usually fine textured. Water intake rates are slow to moderate and water-holding capacity is low to moderately high, depending on depth.

Perennial grasses dominate this site, and it is characterized by such species as blue grama, sideoats grama, little bluestem, western wheatgrass, spike muhly, and species of Stipa or needlegrasses. Shrubs and half-shrubs may include shrub liveoak, skunkbush sumac, and winterfat. Wright buckwheat may be the most common native forb. Continuous yearlong grazing may cause a decline or disappearance of cool-season grasses and preferred browse plants. If grazing use is heavy or prolonged, such plants as sideoats grama, little bluestem, spike muhly, and black grama also decrease. Ordinarily, as retrogression continues, blue grama, tobosa or galleta, curly mesquite, threeawns, and broom snakeweed begin to dominate. Eventually, even blue grama may decline. The site is not highly erodible, however, and recovery can be effectuated through good grazing management at a reasonably rapid rate.

Loamy

This site occurs on level to sometimes strongly sloping Piedmont slopes or plains. Average slopes are 5 percent or less, although slopes may vary as high as 15 percent. Elevations vary from approximately 6,000 to 7,300 feet.

Typical soils are moderately deep to deep and well drained. The surface layer is medium textured loams, fine sandy loams, and very fine sandy loams. Surface and underlying textures may contain gravels but generally contain less than 35 percent. Underlying layers vary from moderately coarse to fine textured. The water-holding capacity is moderately high to high, and permeability is moderately slow to moderate. As vegetative cover deteriorates, however, intake rates may be reduced to slow.

This is a grassland site characterized by a mixture of warm- and cool-season grasses. Dominants are blue grama and western wheatgrass. Also characteristic are such species as bottlebrush squirreltail, spike muhly, sand dropseed, needle-and-thread, and New Mexico feathergrass.

Shrubs and half-shrubs include four-wing saltbush and winterfat. Typical forbs are Wright buckwheat, Rocky Mountain beeplant, and species of Astragalus.

During continuous yearlong grazing, cool-season grasses such as western wheatgrass may decline rapidly. If use is heavy and prolonged, such species as sideoats grama and spike muhly also decline.

Typical site deterioration is characterized by low vigor, sod-like blue grama which may eventually come to make up 80 to 95 percent of the composition. Further deterioration is characterized by increasing amounts of bare ground, possible invasion by woody plants, such as pinyon and juniper, and increasing amounts of ring muhly, threeawns, and sand dropseed. The site is also susceptible to takeover by rabbitbrush. Production in these instances may be cut to one-third or even one-fourth of potential.

Sandy

This site usually occurs on level to gently sloping or undulating topography of upland plains. Slopes average less than 10 percent, while elevations vary from approximately 6,000 to just over 7,200 feet.

The soils of this site are moderately deep to deep, well drained, and may or may not be calcareous throughout. Typically, the surface layer is a sandy loam, fine sandy loam, or loamy fine sand at least 5 or 6 inches thick over sandy loam to clay loam subsoils. Permeability is moderately slow to moderately rapid, and the available water-holding capacity is moderate to high.

This site is characterized by both warm- and cool-season grasses, scattered shrubs, half-shrubs, and forbs. Blue grama and western wheatgrass are co-dominants, with Indian ricegrass and dropseed closely associated. Principal shrubs and half-shrubs include four-wing saltbush, winterfat, and sand sagebrush. Rocky Mountain beeplant is often the most noticeable forb. Broom snakeweed is most common in certain wet years and when the plant community deteriorates from its potential.

Under continuous yearlong grazing, cool-season grasses, such as western wheatgrass, Indian ricegrass, and needle-and-thread, may decline or even disappear. If use is heavy and prolonged, many of the more palatable warm-season species also decline. The site in a typically deteriorated condition may be characterized by low vigor, sod-like blue grama and possibly some galleta. Further deterioration is characterized by increasing amounts of bare ground, increases in ring muhly, sandhill muhly, threeawns and rabbitbrush, and by certain annual forbs. Production in these instances may be cut to one-third or less of the potential, and soil blowing may become severe. The site, in certain instances, is subject to invasion by woody species such as pinyon pine and juniper.

Gravelly

The topography of this site ranges from gently to strongly sloping and may occur as low, rolling hills and ridges dissected by natural arroyos or in combination with rock outcrop and badlands which are on very steep slopes. Average slopes are less than 15 percent, and aspect is variable; while elevations vary from approximately 6,000 to 7,300 feet.

The soils are moderately deep to deep. The surface and underlying layers are either gravelly or very gravelly loams, sandy loams, and fine sandy loams. The soils are well drained and moderately to rapidly permeable. The available water-holding capacity is moderate to low. Erosion is normally none to slight unless natural plant cover is seriously reduced.

This site supports a mixture of warm- and cool-season grasses such as blue grama, sideoats grama, spike muhly, New Mexico feathergrass, western wheatgrass, and bottlebrush squirreltail. Shrubs and half-shrubs include winterfat, small soapweed, Apache-plume, and rabbitbrush. Pinyon pine or juniper may occur but are significant only as visual aspect species when they do. Forbs are a minor component of the potential plant community on this site.

Under continuous yearlong grazing, cool-season grasses, such as New Mexico feathergrass, needle-and-thread, western wheatgrass, bottlebrush squirreltail, and Indian ricegrass, frequently decline or even disappear. Prolonged heavy use also causes the decline of such grasses as sideoats grama, spike muhly, and little bluestem, and the site may become characterized by a high density of low vigor, sod-like blue grama that may make up to 90 percent of the species composition. Advanced deterioration is characterized by increases in ring muhly, threeawns, and rabbitbrush. Production in such instances may be cut to one-third or even one-fourth of potential.

Deep Sand

This site occurs on level to gently sloping or undulating topography. Slopes vary most often from 1 to 10 percent, while elevations vary from approximately 6,000 to 7,300 feet.

The soils of this site are typically eolian deposits of coarse sands, fine sands, or loamy sands over similarly coarse textured underlying layers. They are deep, have rapid permeability, and moderate to low available water-holding capacity. They are subject to severe soil blowing whenever plant cover becomes sparse.

This is predominantly a grassland site characterized by both warm- and cool-season grasses, low growing shrubs and half-shrubs, and a variety of forbs. Natural co-dominants are Indian ricegrass, blue grama, and spike dropseed. Shrubs and half-shrubs include sand sagebrush, and scattered rabbitbrush. Forbs may include wild buckwheat and stickleaf mentzelia.

Under continuous yearlong grazing, cool-season grasses such as Indian ricegrass may decline rapidly. If use is heavy and prolonged, such species as blue grama and black grama also decline. Severe site deterioration is characterized by increased amounts of bare soil, an increase or invasion by woody plants and annuals, and such grasses as sandhill muhly, threeawns, and ring muhly. Soil blowing and hummocking also occur under this condition and production is cut severely. The site is also sometimes invaded by woody species such as pinyon pine and juniper or, in rare instances, ponderosa pine, and may thus support relatively long-lived stands of these species.

Shallow

This site occurs on gently sloping to undulating terrain. Slopes vary from 1 to 15 percent, while elevations vary from 6,000 to 7,300 feet.

Soil surface textures are typically medium and the soils are usually gravelly, cobbly, or stony throughout the profile. They are shallow to very shallow over a hardened layer such as caliche or unweathered limestone bedrock. Permeability is moderate to rapid, but the available water-holding capacity is usually low.

This is a grassland site characterized by a mixture of warm- and cool-season grasses. Dominants are likely to include blue grama, New Mexico feathergrass, and sideoats grama. Also characteristic are such species as needle-and-thread, little bluestem, galleta, bottlebrush squirreltail, sand dropseed, and spike muhly. Shrubs and half-shrubs may include juniper, bigelow sagebrush, and winterfat. Substantial populations of forbs are not characteristic of the natural plant community.

Heavy, prolonged grazing use on a continuous basis most likely results in a rapid decrease in cool-season grasses, and a more gradual but eventually just as certain decrease in sideoats grama, winterfat, little bluestem, spike muhly, and blue grama. Advanced site deterioration may be typified by an increase of such plants as broom snakeweed, ring muhly, and threeawns. The site is also subject to invasion by woody plants such as rabbitbrush.

Cinder

This site is on nearly level to moderately sloping or rolling uplands found near cones or craters. Slopes average 10 percent or less and do not ordinarily exceed 15 percent, while elevations vary from approximately 6,000 to 7,800 feet.

These soils are derived from volcanic cinders. Typically, they have gravelly or very gravelly loam surfaces, but these may be gravelly or very gravelly sandy loams or sandy clay loams. They are moderately deep to deep and are well drained. The subsoils are usually gravelly or very gravelly throughout. Permeability is moderately rapid, and the available water-holding capacity is low to moderate.

This is an open site characterized by perennial bunchgrasses, scattered shrubs, and half-shrubs. Blue grama, sideoats grama, and galleta are significant warm-season species, while New Mexico feathergrass, western wheatgrass, and bottlebrush squirreltail are the most frequently encountered cool-season species. Widely scattered patches of wolfberry, Apache plume, or four-wing saltbush are common. Various species of forbs occur and are evenly distributed.

Continuous yearlong grazing by cattle ordinarily results in a decrease in such species as New Mexico feathergrass, needle-and-thread, western wheatgrass, and bottlebrush squirreltail. Prolonged heavy use also causes a decline of sideoats grama, winterfat, and spike muhly. Blue grama may initially increase to the point that it occupies 75 to 80 percent of the species composition. The site, at this point, is also characterized by increases in ring muhly, threeawns, rabbitbrush, and possibly pinyon and juniper. Production in these instances may be cut substantially.

Bottomland

This site occurs in valley or flood plain positions, including large swales or draws with substantial drainage areas, which receive periodic inundation from flood waters. Slopes average less than 3 percent, while elevations vary from approximately 6,000 to 7,300 feet.

These soils are deep with moderately fine to moderately coarse textured surfaces. Permeability is moderate to moderately slow, and the available water-holding capacity is moderately high to high. A thin strata of subsurface materials from gravel to clay is common. Erosion hazard is slight when vegetative cover is at or near its potential.

This is a high producing grassland site dominated by such species as alkali sacaton, vine-mesquite, western wheatgrass, and blue grama. Lesser amounts of spike muhly, bottlebrush squirreltail, and galleta are also common. Four-wing saltbush and rabbitbrush are the more common shrubs or half-shrubs. Forbs are minor but are evenly distributed over the site.

Site deterioration due to excessive grazing is characterized by a decrease in alkali sacaton, vine-mesquite, and western wheatgrass. Blue grama increases initially and may dominate the site. Following long-term deterioration, rabbitbrush or sagebrush may take over, blue grama becomes patchy and very unproductive, and such grasses as mat muhly and ring muhly may become the dominant herbaceous vegetation on the site. The site is subject to gullying or draining when the natural potential vegetation is so disturbed and may not be recoverable using livestock grazing/management actions, exclusively.

Clayey Bottomland

This site occurs in valley or floodplain positions, including swales or draws with substantial drainage areas, which receive periodic inundation from flood waters. Slopes average less than 3 percent, while elevations vary from 6,000 to 7,300 feet.

These soils are moderately deep to deep with fine or very fine textured surfaces. Permeablility is moderately slow to slow. Available water-holding capacity is moderate to high. A thin strata of subsurface materials from gravel to clay is common. Erosion hazard is mainly in the form of gullying, piping, and draining of the site when vegetation has deteriorated from its natural potential.

This site, typically, is dominated by western wheatgrass. Vine-mesquite, blue grama, galleta, and spike muhly occur in lesser amounts but are common and important components of the potential plant community. Alkali sacaton and giant sacaton are found but on a less consistent level of occurrence than most of the other species characteristic of the site. Shrubs include four-wing saltbush, rabbitbrush, and sometimes winterfat. Forbs occur in minor but evenly distributed amounts across the site.

Excessive grazing use over a prolonged period causes a decrease in western wheatgrass, vine-mesquite, and alkali sacaton. Blue grama may increase initially but eventually decreases if heavy grazing continues; the site then becomes subject to a takeover by rabbitbrush and other invading woody plants such as sagebrush or greasewood. The site is subject to gullying or draining when the natural potential vegetation is so disturbed and may not be recoverable using livestock grazing/management actions, exclusively.

Swale

The topography of this site is level to moderately sloping and usually occurs in a slightly depressed position which receives runoff from adjacent sites. Slopes vary to 10 percent but average less than 5 percent, while elevations vary from 6,000 to just over 7,000 feet.

Soils are typically moderately fine to fine textured on the surface (or very thin surface loams, sandy loams, or sandy clay loams, over fine textured subsoils), moderately deep to deep with moderately fine to fine textured subsoils. Permeability is usually slow, and the available water-holding capacity is moderately high to high. Soil cracking following dry periods provides an opportunity for occasional deep wetting when moisture is received; although runoff, in the absence of good vegetative cover, can be excessive. Erosion hazard is high.

This site is characterized by such grasses as western wheatgrass, alkali sacaton, blue grama, and galleta. Shrubs and half-shrubs include four-wing saltbush, rabbitbrush, and winterfat. Forbs are naturally variable in kind and amount and make up what is a relatively broad fluctuation in their percentage of the natural plant community. They are evenly distributed, however, and at times enjoy a significant "aspect" influence.

Under continuous yearlong grazing, cool-season grasses, such as western wheatgrass and bottlebrush squirreltail, tend to decline or disappear. If use is heavy and prolonged, some of the more palatable warm-season species also decline. The site, in a typically deteriorated condition, may be characterized by threeawns, ring muhly, and low vigor sod-like blue grama mixed with heavy stands of rabbitbrush and broom snakeweed. Excessive amounts of bare ground also occur, and the site is highly subject to gullying at this stage. It may also be slow to recover using livestock grazing/management actions, exclusively.

Shallow Sandstone

The topography of this site is level to moderately sloping with slopes varying from 0 to 15 percent. Elevations vary from 6,000 to 7,500 feet.

These soils are shallow to very shallow over sandstone. Surface textures are medium to coarse and may be stony or gravelly. Permeability is rapid to moderately slow, and the available water-holding capacity is generally low.

As compared with adjoining or associated sites, this site is characterized by relatively moderate production and is dominated by blue grama and sideoats grama. Common, but occurring in lesser amounts, are little bluestem, Indian ricegrass, New Mexico feathergrass, galleta, and sometimes needle-and-thread. Other characteristic species include sand dropseed, spike dropseed, threeawns, winterfat, Bigelow sagebrush, pinyon, and juniper.

Under heavy or continuous yearlong grazing, rapid deterioration of the plant community may take place and the site may become characterized by a dominance of low-value grasses, woody plants, vastly reduced productivity, and a high incidence of surface erosion. Mechanical brush control is generally unfeasible due to shallow soil, and recovery using livestock grazing/management actions alone may be difficult to achieve.

Sandstone Hills

The topography of this site varies from moderately steep to steep and occurs frequently in association with sandstone outcrop or badlands. Slopes generally exceed 15 percent and may, on occasion, reach as high as 70 percent, while elevations vary from 6,000 to 7,800 feet.

The soils found on this site are generally shallow to very shallow over sandstone. Surface textures are typically sandy loams, fine sandy loams, very fine sandy loams or loams, which often are gravelly, stony, or cobbly. Pockets of deeper soils occur in association with the site as well as occasional to frequent outcroppings of sandstone and badlands, either of which may affect livestock movements. Typically, permeability is moderate to moderately rapid, and the available water-holding capacity is low.

This is a moderate producing site characterized by a mixture of short- and mid-grasses, shrubs, and scattered trees. Sideoats grama, blue grama, little bluestem, Indian ricegrass, New Mexico feathergrass, galleta, and occasionally black grama are common grasses. Pinyon pine and species of juniper characterize the tree aspect of the site, while such shrubs and half-shrubs as skunkbush sumac, oakbrush, mountain mahogany, and winterfat are common shrub and half-shrub species. Bigelow sagebrush, spineless horsebrush, and broom snakeweed are encountered in small amounts.

Deterioration of the potential plant community due to inadequately managed grazing is usually typified by an increase in low-value grasses such as threeawns and hairy grama as well as such woody species as pinyon, juniper, rabbitbrush, oakbrush, and broom snakeweed. Under severe deterioration, erosion hazard becomes quite high, and the site may become severely limited for grazing.

Limestone Hills

This site is characterized by rolling to steep hills and mountain foot slopes. Slopes average 25 percent or more but vary from 15 to 75 percent; exposure or direction of slope is also variable. Limestone outcrops, exposed ledges, and occasional boulders are not unusual. Elevations vary from 5,000 to 7,800 feet.

Soils characterizing this site are typically shallow over limestone, although pockets of deeper soils also exist. They may be loams, clay loams, or sandy loams, and are frequently stony, gravelly, or cobbly. Permeability is moderate to moderately rapid, but the available water-holding capacity may be low due to the shallow nature of the soil.

The potential plant community of this site has a mixed grassland, shrub, half-shrub aspect with only occasional tree-type junipers or pinyon pines being present. Mid- and short-grasses dominate, with shrubs and half-shrubs following. Forbs are a minor component, but a variety does occur, and they are evenly distributed over the site. Cool-season grasses and shrubs are more prevalent on north- and east-facing slopes, while warm-season, short-grasses and half-shrubs prevail on south- and west-facing slopes. This potential plant community is relatively high producing and affords good forage and browse for both livestock and wildlife.

Deterioration of the potential plant community due to inadequately managed grazing is usually characterized by a decline in New Mexico feathergrass, black grama, sideoats grama, mountain mahogany, little bluestem, and winterfat. As these plants decline, they are replaced by juniper, oakbrush, broom snakeweed, and lesser value grasses such as galleta and threeawns.

Hills

This site is characterized by rolling to steep hills and mountain footslopes. Slopes average 25 percent or more but vary in extremes from 15 percent to 75 percent; exposure or direction of slope is also variable. Rock outcrops, exposed ledges, and occasional boulders are not uncommon. Elevations vary from 6,000 to 7,800 feet.

Soils characterizing this site are typically shallow over acid igneous bedrock, although pockets of deeper soils also occur in saddles, between ledges, and lower side slopes. They may be loams, clay loams, or sandy loams, and are usually stony, gravelly or cobbly. Permeability is moderate to moderately slow, and the available water capacity is low due to shallow depth.

The potential plant community of this site has a mixed shrub/grassland aspect with scattered tree-type junipers and pinyon pines. The shrub and tree component is more visually prevalent on the cooler, north- and east-facing slopes, while low-growing shrubs and grasses prevail on south- and west-facing slopes. Dominant grasses include sideoats grama, blue grama, species of Muhlenbergia, and sometimes black grama (south-facing slopes). Cool-season species, such as New Mexico feathergrass, and needle-and-thread, are most common on north-facing slopes. Green sprangletop, little bluestem, and bullgrass are typical aspect grasses on this site. Shrubs include skunkbush sumac, mountain mahogany, and species of oak.

Deterioration of the potential plant community due to inadequately managed grazing is most often typified by a decline in such desirable plants as sideoats grama, black grama, cool-season grasses, mountain mahogany, and winterfat. As these plants decline, they are replaced by pinyon, juniper, broom snakeweed, and lesser forage value grasses such as threeawns and galleta.

Salt Flats

This site occurs on level to gentle slopes which average 3 percent or less and rarely exceed 8 percent. Exposures are variable although usually not significant, and what is normally a uniform slope may be broken intermittently throughout the site by natural playas, potholes, or arroyos. Elevations vary from 6,000 to 7,500 feet.

The soils of this site are typically deep, silty clay loams to clay loams and clays and are affected by both high alkalinity and total soluble salts. Surface crusting and sealing are common. Permeability is moderately slow to very slow, and ponding is not uncommon following summer rainstorms. Total available water-holding capacity is high but that available to plants is often low.

The aspect of this site is generally one of a grassland mixed with scattered shrubs such as four-wing saltbush, shadscale, and greasewood. Alkali sacaton is both the composition dominant and the aspect dominant for the site. Forbs are a variable and minor component of the plant community.

Site deterioration due to inadequately managed grazing usually results in a decline in alkali sacaton, western wheatgrass, vine-mesquite, and blue grama. Woody species increase under this circumstance and may dominate the site eventually if the condition is not reversed. Production favorable to livestock grazing is then substantially reduced.

Savannah

This site normally occurs on gently to moderately sloping topography. Typically, areas of steeper slopes connect from above, and the Savannah site becomes a gradation down to more level upland plains. Slopes average about 7 percent but occasionally reach to just above 10 percent, while elevations vary from approximately 6,000 to 7,200 feet.

The soils in this site are moderately deep to deep and well drained. Typically, the surface layer is sandy loam, fine sandy loam, or loamy fine sand over somewhat finer textured subsoils. Occasionally, the surface may be loam. Permeability is moderate to rapid, and water-holding capacity is moderate.

This site is characterized by scattered large tree-type pinyon-juniper with open grass stands in between. Understory grasses are dominantly blue grama, western wheatgrass, Indian ricegrass, and sand dropseed. Pinyon ricegrass and pine dropseed may also be found, usually beneath the trees and at the higher elevation ranges of the site. Winterfat and some forbs may occur in significant amounts. Broom snakeweed is most common in certain good rainfall years and when the understory plant community deteriorates from its potential. Reproduction of pinyon pine and juniper is normally very slow and, historically, may have been controlled by natural fire. Tree canopy of the natural potential plant community averages approximately 25 percent.

In exceptional cases, a few more or less even-aged ponderosa pine may occur on this site naturally. Reproduction of this species is ordinarily even less evident than that of pinyon or juniper, and no more than 1 or 2 percent of the understory is likely to be made up of pine seedlings, even in the absence of livestock grazing.

Under continuous yearlong grazing, cool-season grasses such as western wheatgrass and Indian ricegrass characteristically decline or even disappear. If use is heavy and prolonged, the more palatable warm-season grasses also decline, pinyon and juniper increase, and the site becomes characterized by low vigor, sod-like blue grama, ring muhly, threeawn, and overall reduced herbaceous plant density. Understory production may eventually be reduced to one-third or less of the site's original potential. Pinyon and juniper may increase to the point that the site eventually takes on the appearance of a woodland.

Range Sites-Arizona and New Mexico Mountains

Pine Grassland

This site occurs on gently sloping to rolling topography usually associated with mountainous surroundings. Slopes average less than 10 percent but vary to 15 percent and occasionally higher. Elevations vary widely - from just over 6,000 to above 8,000 feet. More typically the site is found at 7,500 feet or just above.

Soils are typically moderately deep to deep. Surface textures range from sandy loams to clay loams. Soils may contain coarse fragments but are not skeletal. Underlying layers may be gravelly. The soils are well drained and have moderate permeability. Organic matter is moderate to high, and runoff is medium to slow. Available water-holding capacity is moderate to high.

This site is a savannah-like grassland typically overstoried by a thin stand of ponderosa pine. Occasionally, alligator juniper and oak also occur. Cool-season grasses such as Arizona fescue dominate the herbaceous community with a variety of forbs such as green sagewort, western wallflower, and Fremont's goosefoot scattered uniformly. Tree canopy varies from 5 to 20 percent and averages about 10 percent.

Continued heavy grazing almost certainly causes a decline, with cool-season grasses such as Arizona fescue being the first to decrease. Blue grama increases under such a decline, as does threeawn, annual forbs, and woody species, especially half-shrubs. Kentucky bluegrass may occur as a naturalized species.

Mountain Malpais

This site varies from gently sloping to steep - 0 to 40 percent; also, exposures are variable. Basalt outcroppings and stony or rocky soils are common. Elevations may be over 9,000 feet but are typically between 7,000 and 8,500 feet.

Surface textures are characteristically stony, cobbly, gravelly or clay loams. The soils are very shallow to shallow over basalt, with pockets of deeper soils that are stony or cobbly throughout. Soil-moisture relationships are good, and soil temperatures may be slightly higher than on associated soils due to darker color. Available water-holding capacity is very low to low while permeability is moderately slow to slow.

This is an open grassland site that is typically all but free of trees and large shrubs, although on steeper, north-facing slopes scattered juniper, oaks, and ponderosa pine may occur. Forbs include wild buckwheat, trailing fleabane, and Indian paintbrush. Tree canopy normally does not exceed 10 percent, even on the north slopes, and averages 5 percent or less.

Continued heavy use almost certainly causes a decline of better forage plants, and cool-season species such as Arizona fescue are usually the first to go. Blue grama has a tendency to increase under such circumstances, as do annual forbs and certain half-shrubs and shrubs.

Stony Loam

Topography is gently rolling to rolling with extremes in slopes varying from 0 to 40 percent. Elevations vary between 7,000 and about 9,000 feet, but are more typically in the 7,500 to 8,500 foot range.

Surfaces are thin gravelly loams and clay loams. Subsurfaces are stony or cobbly. Soils are moderately deep to deep. They may be formed over basalt but seldom include outcroppings. Available water-holding capacity is moderate to high; permeability is moderate to slow.

This is a grassland site with few if any trees. Cool-season grasses predominate. Shrubs are sparse and normally restricted to north-facing slopes and higher elevations. Forbs such as trailing fleabane, wild buckwheat, globemallow, sageworts, and Indian paintbrush are noticeable but do not make up a substantial proportion of the potential plant community.

Continuous grazing in the same season, year after year, may cause decline in range conditions. Continued heavy use almost certainly causes such a decline, with cool-season plants such as Arizona fescue being the first to go. Blue grama increases under such circumstances and may eventually dominate the site in a sod-like, low vigor form that is very unproductive when compared to the potential plant community. Shrubs, half-shrubs and annuals also increase as range condition declines.

Mountain Upland

This site occurs on slopes varying to 15 percent but averaging 5 percent or less. The landscape is typically that of a large intermountain park or plain, which may be interrupted by small drainages and swales. Elevation is upward from 6,500 feet.

Soils are moderately deep to deep. Surface textures are medium to moderately fine with generally few coarse fragments in the profile. Subsurfaces are clay loams to very gravelly loams. They are well drained and have moderately slow permeability. Organic matter is moderate and runoff is medium. Available water-holding capacity is moderate to high.

This site is an open grassland characterized by mid- and short-grasses. Shrubs and half-shrubs are few. Forbs include Rocky Mountain beeplant, aster, Rocky Mountain zinnia, wild buckwheat, trailing fleabane, and Carruth sagewort. Blue grama, muttongrass, Arizona fescue, prairie Junegrass, and bottlebrush squirreltail are characteristic of the natural potential vegetation. Western wheatgrass is found largely on the finer textured soils and in slight depressions. Spike muhly is found evenly distributed but in lesser amounts than most other species characterizing the site. Broom snakeweed comes and goes cyclically. Scattered plants of rabbitbrush are common.

Continued heavy grazing almost certainly causes a decrease in Arizona fescue, muttongrass, and other cool-season species. Blue grama tends to increase under this circumstance and eventually assumes a sod-like, low vigor form that is very unproductive when compared to the natural potential plant community. Rabbitbrush may increase substantially also, along with other low value plants such as broom snakeweed.

Shallow Hills

The terrain in which this site occurs is rolling or hilly, sometimes steep. Slopes average about 15 percent but vary from 10 to just over 40 percent. Exposed bedrock and ledges occur occasionally and exposure varies. Elevation is typically 7,000 feet or above.

Soils are very shallow to shallow over bedrock and are derived from such parent materials as volcanic tuff. Surface textures are loams or sandy loams and are usually gravelly, stony, or cobbly. Permeability varies from moderately rapid to moderately slow. Available water-holding capacity is very low to low and runoff is medium.

Vegetation on this site is actually an expression of several closely interrelated and difficult-to-separate plant communities. Factors such as exposure, intermixed pockets of deeper soil, exposed bedrock, and ledges contribute to this association of plants.

Generally all exposures are open and are dominated by perennial grasses. Cool season species are more prevalent on north- and east-facing slopes, while blue grama, little bluestem, and sideoats grama are more frequently encountered on south- and west-facing slopes. Large shrubs and trees are few and scattered, and where recurring usually occupy north-facing slopes. Half-shrubs occur thinly across the site. Forbs include wild buckwheat, trailing fleabane, lupines, sageworts, and Indian paintbrush.

Mountain Breaks

This site recurs generally on strongly sloping to very steep topography and is characteristically associated with abrupt interruptions in the terrain. Rock outcrops and ledges are mixed with nearly level benches and occasionally areas of gentle to moderately steep slopes. Elevations vary greatly - from just over 6,000 to above 8,000 feet. Typically, however, the site occurs around 7,000 feet.

Soils are shallow to moderately deep and may be gravelly or cobbly sandy loams, fine sandy loams or loams. Parent material is variable, ranging from sandstone to volcanic tuff. Runoff is medium to rapid, permeability is moderate to rapid, and available water-holding capacity is very low to low.

This site supports a mixed grass/shrub land with some trees. Cool-season grasses predominate slightly, although warm-season species such as deergrass, bullgrass, blue grama, and little bluestem are highly noticeable. Pinyon and juniper are common, as are a few ponderosa pine. Exposure is definitely a factor, with tree and shrub species occurring more frequently on the cooler, more moist slopes.

Yearlong, heavy use by livestock should be avoided as this tends to create a decline in range condition, increase erosion, and reduce range productivity.

Mountain Swale

This site occurs in small drainages and low-lying areas where runon water is received. It does not occupy major overflow areas, however. Slopes vary from 1 to 5 percent and elevations are upward from about 7,000 feet.

The soils of this site are deep and well drained. Surfaces vary from sandy loams to clay loams and subsoils are typically fine textured. Available water-holding capacity is high and permeability is moderately slow.

This site is a potentially productive grassland with few shrubs and half-shrubs and no trees. Western wheatgrass may either dominate the site or co-dominate with slender wheatgrass. Forbs are relatively minor in proportion to grasses, but include crested pricklypoppy, Rocky Mountain beeplant, green sagewort, milkweeds, thistles, asters, and Mexican crownbeard.

Continuous yearlong grazing, especially if heavy, generally causes a decrease of western wheatgrass and other cool-season grasses typical of the site. Blue grama, half-shrubs, and other lesser value plants then take over and production decreases substantially.

Shallow Savannah

This site occurs on undulating to moderately rolling topography and is typically associated with steeper hills having much exposed bedrock. Slopes vary from 3 to 15 percent but average less than 10 percent, while elevations are upward from about 7,000 feet.

Soils are very shallow to shallow over a bedrock that is typically volcanic tuff. Surfaces are gravelly and range from sandy loams to clay loams in texture. Subsoils range from gravelly sands to cobbly clay loams. Permeability is rapid to moderately slow, runoff is medium to rapid, and available water-holding capacity is low to very low.

This site is a grassland mixed with shrubs and overstoried by very thin or scattered stands of ponderosa pine, pinyon pine, and alligator juniper. Shrubs are typically mountain mahogany, skunkbush sumac, and oaks. Forbs include Fremont's goosefoot, wild buckwheat, green sagewort, and trailing fleabane. Tree canopy generally does not exceed 15 percent and averages about 8 percent.

Heavy continuous grazing almost certainly causes a decline in range condition, and cool-season grasses such as muttongrass and Arizona fescue are usually the first to decrease. Blue grama and the less palatable half-shrubs and shrubs increase, at least initially, and production drops.

Basalt Hills

This site is characterized by moderately steep rolling hills leading into foot slopes of mountainous terrain. Basaltic influence is readily evident with the high quantity of basaltic stone cover. Boulders are frequently encountered. Elevation varies from 8,000 to 9,000 feet, while slopes average 30 percent but have extremes from 15 to 70 percent.

Soil surface textures vary from stony clay loams and stony fine sandy loams to cobbly loams and cobbly fine sandy loams. Water intake rates are slow to moderate; water-holding capacity is low due to the steepness of the slopes to moderately high.

The vegetation is predominately grass with occasional pinyon, juniper, and oak trees. Cool-season grasses such as Arizona fescue comprise the bulk of the herbaceous vegetation along with some warm-season grasses and forbs. Shrubs are also a minor constituent.

Under continuous heavy grazing, the desirable forage grasses, especially cool-season species such as Arizona fescue, decrease. Blue grama increases along with threeawn, annual forbs, and woody species.

Rocky Mountain Malpais

On this site, slopes vary from 0 to 10 percent or more with a dominant slope of 3 percent. Bare lava rock is exposed as knolls. Elevations vary from 6,500 to 9,000 feet.

Soils are shallow to deep and are developing from or over basalt. They have loam, stony loam, and stony clay loam surface textures. Boulders on the surface are common. Water intake rates are moderate to rapid with medium water-holding capacity.

The vegetation is a mixture of grasses, shrubs, and trees. Predominant grasses include mountain muhly, little bluestem, and blue grama, while shrubs include rabbitbrush, Apache-plume, and currant. Pinyon, juniper, and ponderosa pine occur along with forbs such as Carruth's sagewort.

Under continuous heavy grazing, most cool-season grasses and some warm-season species decline. Blue grama increases along with rabbitbrush and sagewort.

Rocky Mountain Loam

On this site, slopes vary from 0 to 25 percent or more with an average of 3 to 9 percent. At higher elevations, the site is confined to the south- and southwest-facing slopes. Elevations vary from 6,500 to 8,000 feet.

Soils are deep to moderately deep with medium to moderate fine surface textures. Gravel or stones are often present on the surface and throughout the profile. Water intake rates are moderate; water-holding capacities are high.

Vegetation is mostly grass with some shrubs and trees. Dominant grasses include Arizona fescue, mountain muhly, little bluestem, and blue grama. Some rabbitbrush, snakeweed, pinyon, juniper, and ponderosa pine are also present.

Under continuous heavy grazing, grasses such as Arizona fescue, little bluestem, and mountain muhly decrease while blue grama, rabbitbrush, and snakeweed become more prevalent. After prolonged heavy use pinque, Kentucky bluegrass, and annuals are apparent.

Non-Range Sites

Scattered throughout the area are 73,286 acres of sites unsuitable for grazing because of lack of vegetation, inaccessability, or erodibility. They include lava, sandstone cliffs, ungrazable woodland, gravel pits, cultivated fields, ash, badlands, blownout land, and riverwashes. Vegetation is usually sparse, and most species in them also occur on nearby range sites.

Existing Vegetative Land Treatments

Minimal acreage has been previously treated in the DPA. No follow-up maintenance has been done, and these treatments have subsequently been abandoned.

Threatened, Endangered or Sensitive Plants

Two species, which are under review by the U. S. Fish and Wildlife Service (FWS) (1980) for listing as Threatened or Endangered (T&E), have been found in the DPA and are considered sensitive. Both of these are also of special State concern (New Mexico State Heritage Program). Erigeron rhizomatus occurs in the foothills of the Sawtooth Mountains near Datil, and Astragalus accumbens grows in the Zuni Mountains near Grants. Specific information on these plants is on file at the BLM Socorro District Office. Additional species which are Federally listed, Federal candidates, or of special or State concern have the potential of occurring within the DPA. These species will be discussed in the Biological Assessment, which is being prepared in the BLM Socorro District.

WILDLIFE

The DPA wildlife species and their habitats have been inventoried and mapped. An inventory of terrestrial and aquatic wildlife species was conducted under contract by LGL Ecological Research Associates Inc. of Bryan, Texas in 1979 to 1980. The results of this inventory are contained in the LGL Final Report (1981) located in the BLM Socorro District Planning/EIS Files. The LGL Final Report, as well as inventories and studies conducted by BLM personnel, have been incorporated as the data base for the Socorro District REX2 automated data processing wildlife program for the DPA. The habitat was mapped and classified by vegetative type and landform by BLM personnel utilizing the Integrated Habitat Inventory Classification System (IHICS) (BLM Manual 6602). Using this system, the DPA was divided into dominant vegetation and landforms called Habitat Sites (HS). Groupings of like habitat sites were identified as Standard Habitat Sites (SHS) for purposes of inventory and information analysis. The seven SHS's identified within the DPA are : (1) Broom Snakeweed/Blue Grama, Hill; (2) Rabbitbrush/Blue Grama, Hill; (3) Pinyon/Juniper, Hill; (4) Russian Thistle/Alkali Sacaton, Valley; (5) Four-Wing Saltbush/Blue Grama, Valley; (6) Ponderosa Pine/Pinyon, Lava; and (7) Ponderosa Pine/Pinyon, Mountain.

All data presented in the following SHS descriptions and big game species sections is located in this program. Big game species (mule deer, antelope, elk), raptors and T&E species are discussed in relation to SHS's and separately due to species mobility, known use areas and species sensitivity. A complete species listing by SHS is shown in Appendix D.

Table II-5 presents acreage figures for each SHS within the DPA. The mapped SHS acreage figures (Map II-3) include public, State and private lands but do not include withdrawn land indentified in Chapter I. For this reason SHS acreage figures do not correspond to land status figures presented elsewhere in this document.

Standard Habitat Sites

Broom Snakeweed/Blue Grama, Hill

This SHS, situated primarily on mountain foothills and the rolling hills adjacent to the Malpais Lava Flow (Map II-3), encompasses approximately 343,638 acres of public land. Plant species common to this SHS other than the dominant broom snakeweed and blue grama include fringed sagebrush, winterfat, four-wing saltbush and squirreltail. Special habitat features within this SHS include springs, wells, earthen tanks, the riparian vegetation adjacent to these waters, fences, and scattered trees (less than one tree per section). The SHS provides habitat for several pronghorn antelope herds with two seasonal use areas identified in the DPA (URA BLM Socorro District Planning/EIS files). Other species common to this SHS include Gunnison's prairie dog, spotted ground squirrel, coyote, and badger. This SHS has the highest small mammal species diversity (Table II-5) of the seven SHS's of the DPA. The high small mammal species diversity and open habitat account for this SHS being utilized by nine species of hawks and both the golden and bald eagles as hunting grounds (Winter Raptor Survey, Socorro District Planning/EIS Files).

Rabbitbrush/Blue Grama, Hill

Occurring on approximately 60,405 acres of public land or 6.1 percent of the inventoried area, this SHS is typified by blue grama

TABLE II-5

STANDARD HABITAT SITES WITHIN THE DPA

Standard Habitat Site	Inventoried Acres in DPA[1/]	Public Acres Inventoried In DPA	Diversity Index 2/ Small Mammals	Diversity Index 2/ Summer Birds
Broom Snakeweed/Blue Grama, Hill.	657,288	343,638	1.49	1.72
Rabbitbrush/Blue Grama, Hill.	130,105	60,405	1.36	1.93
Pinyon/Juniper, Hill.	727,581	392,047	1.27	3.30
Russian Thistle/Alkali Sacaton, Valley.	38,350	37,758	0.56	1.63
Four-wing Saltbush/Blue Grama, Valley.	161,615	44,986	1.30	1.79
Ponderosa Pine/Pinyon, Lava.	122,150	50,817	1.38	2.95
Ponderosa Pine/Pinyon, Mountain.	79,000	56,441	1.25	3.25
Total Acres Inventoried -	1,916,089	986,092		
Total Acres DPA -	6,039,519			
Inventory as % of DPA -	31.7%			

1/ Figures include public, State, and private lands but do not include withdrawn land. SHS acreage figures do not correspond to land status figures presented elsewhere.

2/ Species Diversity developed using the Shannon Index of General Diversity (Odum 1971). A larger index number represents a more ecologically diverse habitat and inherent greater species diversity.

Source: BLM Socorro District Planning/EIS Files.

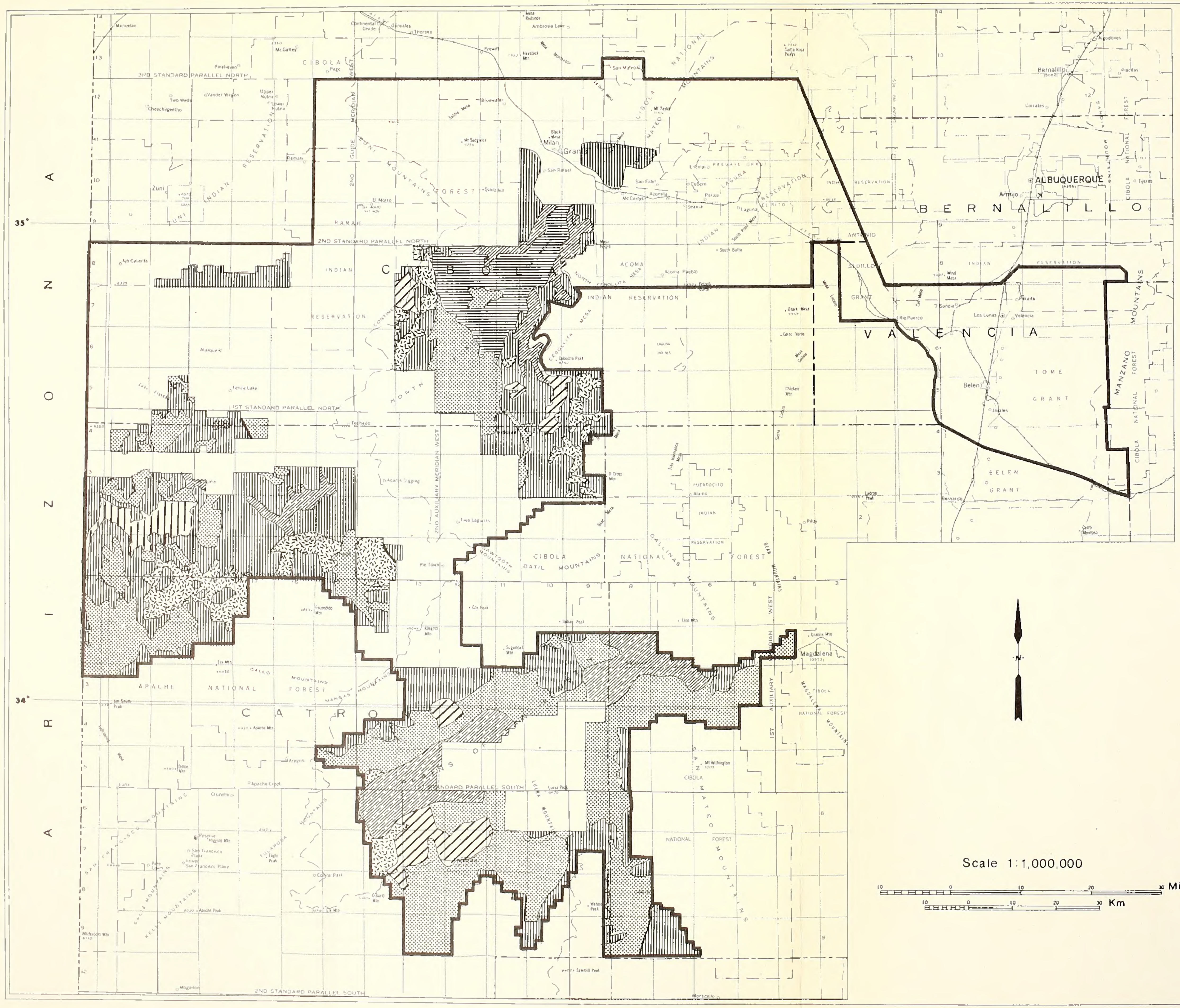
grass covered rolling hills interspersed with drainages or swales of deeper soils dominated by rubber rabbitbrush with a blue grama understory (Map II-3). Other plants common to this SHS include globemallow, specklepod, four-wing saltbush and scattered juniper trees (1 to 2 trees per section). Special habitat features found within this SHS include wells, earthen tanks and fences, as well as several playas (intermittent lakes). Laguna Americana is a large playa (15 to 20 acres) located within this SHS west of the Malpais Lava Flow. The periodic flooding of this playa produces a thick growth of forbs (sunflower, beeplant) heavily utilized by antelope and mule deer. An earthen tank within this playa provides year-round water used by resident wildlife as well as migrating waterfowl. The principal big game species utilizing this SHS are pronghorn antelope though some mule deer occur where the SHS borders forested areas. Other mammal species common to this SHS include black-tailed jackrabbit, rock squirrel, prairie dog, and coyote. Small mammal diversity was not as high as the Broom Snakeweed/Blue Grama SHS; however, bird species diversity in the Rabbitbrush/Blue Grama SHS is the highest of the non-forested areas. The high bird species diversity is attributable to the vegetation structural diversity (canopy variation). Bird species common to this SHS include waterfowl during migration as well as the raven, horned lark, western meadowlark, common nighthawk, mountain bluebird, and several sparrow species. Raptors known to occur in this SHS include the marsh hawk, Ferruginous hawks, and American kestrel.

Pinyon/Juniper, Hill

This SHS includes the pinyon-juniper vegetative type in the DPA, or approximately 392,047 acres of public land which is 40 percent of the inventoried area. Pinyon-juniper vegetation in the DPA is predominately found on mountain foothills, and slopes (Map II-3). The major understory species associated with the pinyon-juniper include mountain mahogany, oak, rubber rabbitbrush, globemallow, blue grama, and sunflower. Special habitat features within this SHS include wells, earthen tanks, springs and associated riparian areas, fences, and cliffs.

This SHS provides the majority of mule deer habitat within the DPA. The SHS averages 1 deer per section with local variations from 0.5 deer per section in the Zuni Salt Lake HS to over 5 deer per section in the Cebolla HS [New Mexico Department of Game and Fish (NMDG&F) Comprehensive Plan, Part 2, 1978]. In addition to mule deer the SHS provides a seasonal use area for wintering elk on Pelona Mountain. Other mammals common to this SHS include desert cottontail, cliff chipmunk, porcupine, rock squirrel, bobcat, and mountain lion.

Small mammal species diversity was one of the lowest of the seven SHS's while bird species diversity was the highest. This high bird species diversity is attributable to the high structural diversity of this SHS's vegetation and the cliffs within the SHS. The cliffs within this SHS provide nesting and roosting habitat for the prairie falcon, red tailed hawk, and golden eagle (DPA-URA). In addition to these raptors other bird species common to this SHS include the fly catcher, vireo's, sparrows, nighthawk, warbler, raven, flickers, and woodpeckers.



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MAP II-3. Standard Habitat Sites

— Divide Planning Area Boundary

LEGEND

- ░ Broom Snakeweed / Blue Grama, Hill
- ▒ Rabbitbrush / Blue Grama, Hill
- ▥ Pinyon / Juniper, Hill
- ▥ Russian Thistle / Alkali Sacaton, Valley
- ▨ Fourwing Saltbush / Blue Grama, Valley
- ▤ Ponderosa Pine / Pinyon, Lava
- ▨ Ponderosa Pine / Pinyon, Mountain

Source: BLM Socorro District Planning / EIS Files

Russian Thistle/Alkali Sacaton, Valley

Covering approximately 37,758 acres of public land or 4 percent of the inventoried area, this SHS is found in large flat valleys bordered by Pinyon/Juniper Hills in the Quemado portion of the DPA (Map II-3). Alkali sacaton is nearly the only perennial vegetation present in this SHS, with the majority of vegetation composed of annuals with Russian thistle dominating. Other plant species occurring in this SHS include annual sunflower, western beeplant, globemallow, and asters. Wells and fences are the only special habitat features within this SHS.

Mule deer utilize this SHS along the edge adjacent to Pinyon/Juniper Hills; however, this occurs only when forbs are available. Other mammal species found in this SHS include black-tailed jackrabbit, white-tailed antelope squirrel, Gunnison's prairie dog, western harvest mouse, coyote, and occasionally pronghorn antelope. Both small mammal and bird species diversity of this SHS are the lowest of the seven SHS's within the DPA. Bird species known to occur in this SHS include mourning dove, the common nighthawk, and horned lark.

Four-Wing Saltbush/Blue Grama, Valley

This SHS, commonly occurring in canyon bottoms and on the San Augustine Plain, encompasses approximately 44,986 acres of public land or 4.5 percent of the inventoried area (Map II-3). The dominant vegetation of this SHS is four-wing saltbush with an understory of blue grama. Other plant species known to occur in this SHS include globemallow, galleta grass, dropseeds, winterfat, and annual forbs. Special habitat features of this SHS include fences, wells, springs, and the riparian vegetation associated with these waters.

Two of these riparian areas, Cebolleta Spring and an unnamed spring at an abandoned homestead, provide water and forage for mule deer which commonly occupy the adjoining pinyon-juniper woodland. Pronghorn antelope are the principal big game species found in this SHS with fawning areas identified as being areas of thicker brush and swale bottoms within one mile of water (BLM Antelope Fawning Study 1980, BLM Socorro District Planning/EIS Files). Other mammal species known to occur in this SHS include the desert cottontail rabbit, black-tailed jackrabbit, Ord's kangaroo rat, deer mice, brush mice, white-throated woodrat, and coyote. While small mammal species diversity is not high in this SHS (Table II-5), locally large populations of rodents provide a prey base for raptors. Raptors which utilize this prey base include the marsh hawk, Swainson's hawk, rough legged hawk, golden eagle, and American kestrel. Bird species diversity in this SHS was the fifth highest of the seven SHS's. Birds common to this SHS include most species associated with a grassland shrub vegetation type as well as the American coot, killdeer, mountain plover and several species of dabbling ducks. The species mentioned which commonly are associated with water and shorelines are found at stock tanks and springs where standing water occurs.

Ponderosa Pine/Pinyon Pine, Lava

Found exclusively in the Malpais Lava Flow, this SHS encompasses approximately 50,817 acres of public land or 5 percent of the inventoried area (Map II-3). The principal characteristic of this SHS is the landform which is composed of broken and cracked basalt lava beds. The ponderosa pine and pinyon pine vegetation grows in pockets of soil, deposited in the cracks and swales or kipukas of the lava flow. The SHS's vegetation diversity is surprising with numerous understory species including aspen, four-wing saltbush, Apache-plume, juniper, blue grama, globemallow, annual sunflowers and beeplant. The special habitat features within this SHS are principal cliffs and ice caves. There are no wells or springs within the lava flow.

The highest concentration of nesting raptors in the DPA utilizes the cliffs in this SHS called the Narrows. Located on the eastern edge of the SHS, these cliffs provide eyrie locations for at least three pair of prairie falcons, three pair of red-tailed hawk, one pair of golden eagle, two pair of American kestrel, and two pair of great horned owl. The entire 15-mile length of the Narrows shows evidence of raptor use and is also used by wintering raptors as a roost area.

The big game species within this SHS is limited to mule deer found along the edge of the lava. The absence of water seems to prevent mule deer from occupying the majority of this SHS.

Other mammal species known to occur within this SHS include: eight species of bats, desert cottontail rabbit, black-tailed jackrabbit, cliff chipmunk, rock squirrel, Abert's squirrel, porcupine, gray fox, and striped skunk. The small mammal species diversity for this SHS was the second highest (Table II-5) while the bird species diversity was the third highest of the seven SHS's. In addition to the previously named raptors found within this SHS, turkey vulture, Merriam's turkey, mourning dove, hummingbirds, common flicker, woodpeckers, swallows, jays, and many other species are common.

Ponderosa Pine/Pinyon Pine, Mountain

Composed of mature ponderosa in the higher elevations with a ponderosa, pinyon mix on the dryer slopes, this SHS covers approximately 56,441 acres of public land or 6 percent of the inventoried area (Map II-3). Understory vegetation within this SHS includes aspen, mountain mahogany, oak, juniper, eriogonum, globemallow, dropseeds, Indian rice grass, and blue grama. Special habitat features within this SHS include earthen tanks, a spring, one mile of perennial stream (Blue Water), and the riparian vegetation associated with those waters and fences. Many of the earthen reservoirs or tanks in this SHS hold water year-round thus providing for a water source for the mule deer which are commonly found in this habitat.

The Pelona Mountain portion of this SHS provides winter range for elk which migrate from the adjacent Gila National Forest. Other mammal species known to occur in this SHS include the mountain cottontail rabbit, Abert's squirrel, deer mice, pinyon mice, porcupine, gray fox, mountain lion and bobcat. The SHS's small mammal diversity is the second lowest while the bird species diversity, although second highest of the seven SHS's, was nearly equal to the Pinyon/Juniper Hill SHS (Table II-5). Birds common to this SHS include ducks, shorebirds, hawks, the golden eagle, wintering bald eagle, Merriam's turkey, band-tailed pigeon, flickers, woodpeckers, and other forest dwelling species.

Big Game Species

Mule Deer

While mule deer may be found throughout the DPA habitat, only approximately 233,978 acres of BLM administered public lands (DPA, URA-MFP 1981) has the capability of supporting a year-round population. The majority of this mule deer habitat is situated within the forested vegetation SHS's of the DPA (Map II-4).

The NMDG&F Comprehensive Plan (1978) estimates that mule deer numbers have remained stable for the last five years over most of the DPA. Although stable, the current mule deer population, estimated at 2,200 animals, is less than 50 percent of the habitat's optimum capability [BLM, DPA, URA-Management Framework Plan (MFP) 1981]. Several factors seem to be contributing to the mule deer population's less than optimum numbers. Fecal analysis studies conducted within the DPA (BLM Socorro District Planning/EIS Files) have indicated that competition for forage between mule deer and cattle is greatest during the winter and spring. This information, combined with the fact that the majority of mule deer habitat within the DPA is subjected to 12 months per year of livestock grazing, indicates that forage may not be adequate. Forage quality may also be a factor limiting mule deer populations within the DPA. A review of available literature indicates that preferred browse plants are frequently low in energy, crude protein, or phosphorus at some period of the year. Wallmo (1978) reports that the critical level of crude protein (7 percent) is somewhat deficient during the spring in southwest New Mexico. Lack of preferred browse species diversity as indicated by the SHS descriptions and vegetative transect data (BLM, Socorro District Planning/EIS Files) may also contribute to limiting the existing deer population.

Pronghorn Antelope

Pronghorn antelope utilize approximately 360,000 acres of public land within the DPA (Map II-5). Pronghorn population densities within the DPA vary from less than one antelope per 1,000 acres over most of the habitat to over three antelope per 1,000 acres in the Malpais area (NMDG&F Comprehensive Plan 1978). The DPA currently supports a pronghorn antelope population estimated at between 600 to 800 animals (BLM, DPA, URA-MFP 1981). This antelope population is estimated to be approximately 50 percent of the optimum number for the existing habitat's capability (NMDG&F Comprehensive Plan, Part II).

The discussion concerning forage quality for mule deer also applies to pronghorn antelope, as do the results of fecal analysis studies conducted on common antelope and livestock grazing areas (BLM Socorro District Planning/EIS Files). These fecal studies indicate that competition between antelope and cattle exists for spring and summer forbs. With year long livestock grazing on the majority of the allotments, competition for browse between antelope and cattle results during the fall and winter.

Elk

Elk habitat within the DPA is limited to a seasonal winter use area of approximately 13,500 acres of public land on Pelona Mountain. Exact wintering elk population figures are not known. However, winter elk observations by BLM personnel from 1976 through 1980 indicate that increasing numbers of elk are utilizing this winter range. Elk populations within the Apache National Forest are increasing (Wood 1980), which would indicate that potential habitat capabilities (approximately 100 animals for 3 months, BLM DPA URA-MFP 1981) may be utilized within the near future.

Raptors

Hawks, falcons, eagles and owls occur throughout the DPA utilizing every SHS. The Socorro District Raptor Road Census (1979-81 BLM Socorro District Planning /EIS Files) indicates that the greatest raptor species diversity occurs in the Four-Wing Saltbush/Blue Grama, Valley SHS, principally in the San Augustine Plains. The Ponderosa Pine/Pinyon, Mountain SHS had the next highest raptor species diversity and is noteworthy due to the occurrence of bald eagles during the winter (T&E Section). As previously discussed in the SHS descriptions, the special habitat features (cliffs, wells, etc.) within the SHS's have more influence on raptor distribution than the SHS's themselves. These special habitat features, cliffs such as the Narrows, well towers, snag trees, and utility poles provide raptors with perches for nesting, resting, and hunting. More detailed raptor information concerning the DPA is contained in the Socorro District Raptor Road Census Final Report (BLM Socorro District Planning/EIS Files).

Threatened or Endangered Species

There is a potential for five Federally and State endangered animal species to occur within the DPA. These species are listed in Table II-6 with the classification and recorded occurrences.

No mammals, reptiles, or amphibians listed as T&E by the U.S. FWS (1980) or as endangered by the New Mexico State Game Commission (1979) were observed in the DPA. Two bird species listed as endangered by the FWS and the New Mexico State Game Commission, and one bird species listed only by the New Mexico State Game Commission was observed within the DPA. The endangered species, their habitat, and occurrence are discussed individually as follows.

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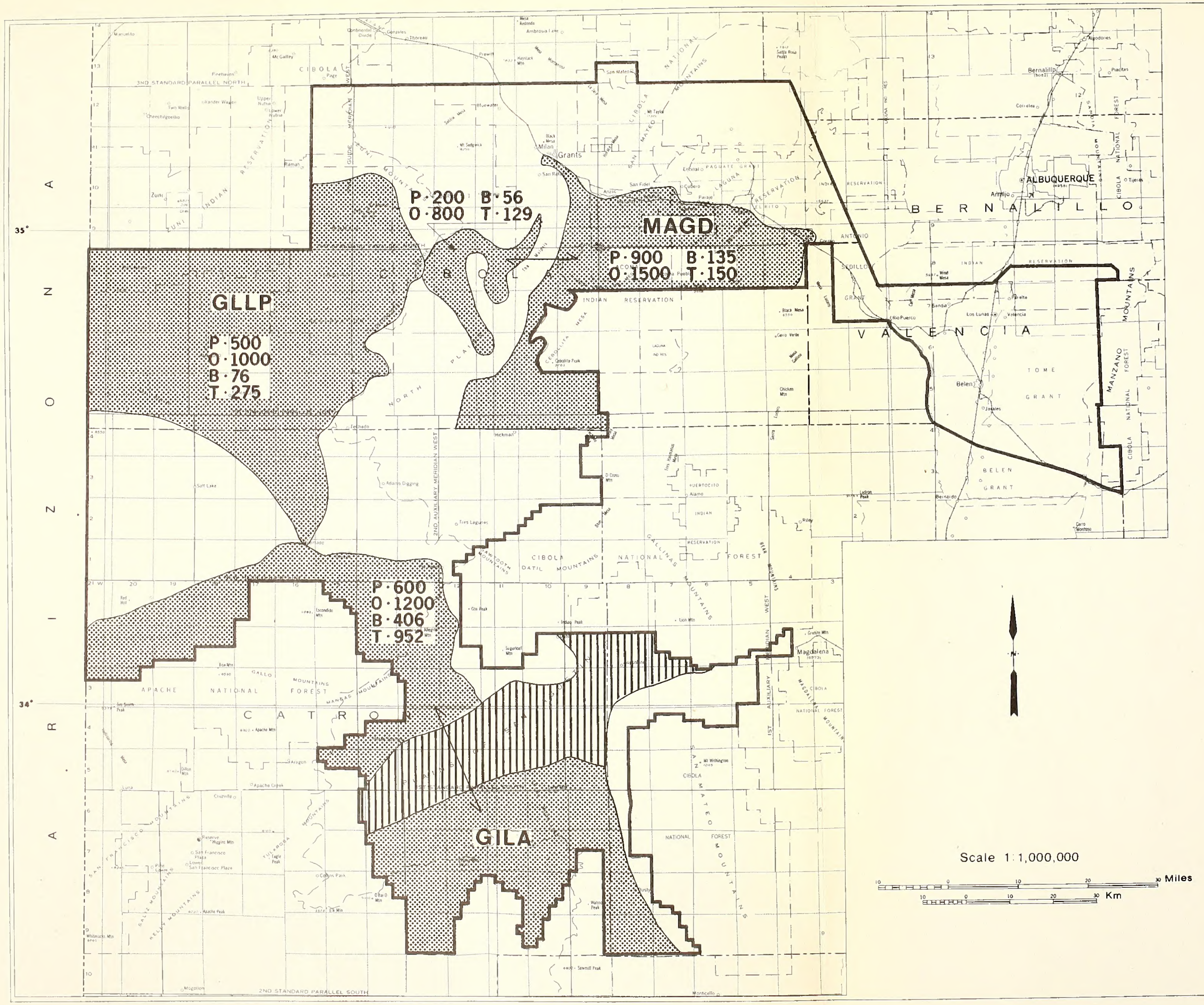
MAP II-4. Deer Herd Units



— Divide Planning Area Boundary

LEGEND

- ▥ UNOCCUPIED DEER HABITAT
- ▒ OCCUPIED DEER HABITAT WHERE DEER DENSITY EQUALS OR EXCEEDS 0.5 DEER PER SECTION

GLLP – Gallup Herd Unit
GILA – Gila Herd Unit
MAGD – Magdalena Herd Unit

HERD POPULATION Population numbers represent herd sizes in population density areas

P – Present
O – Optimum
B – BLM Sections
T – Total Sections

Sources: New Mexico Department of Game & Fish, BLM Socorro District Planning/EIS Files

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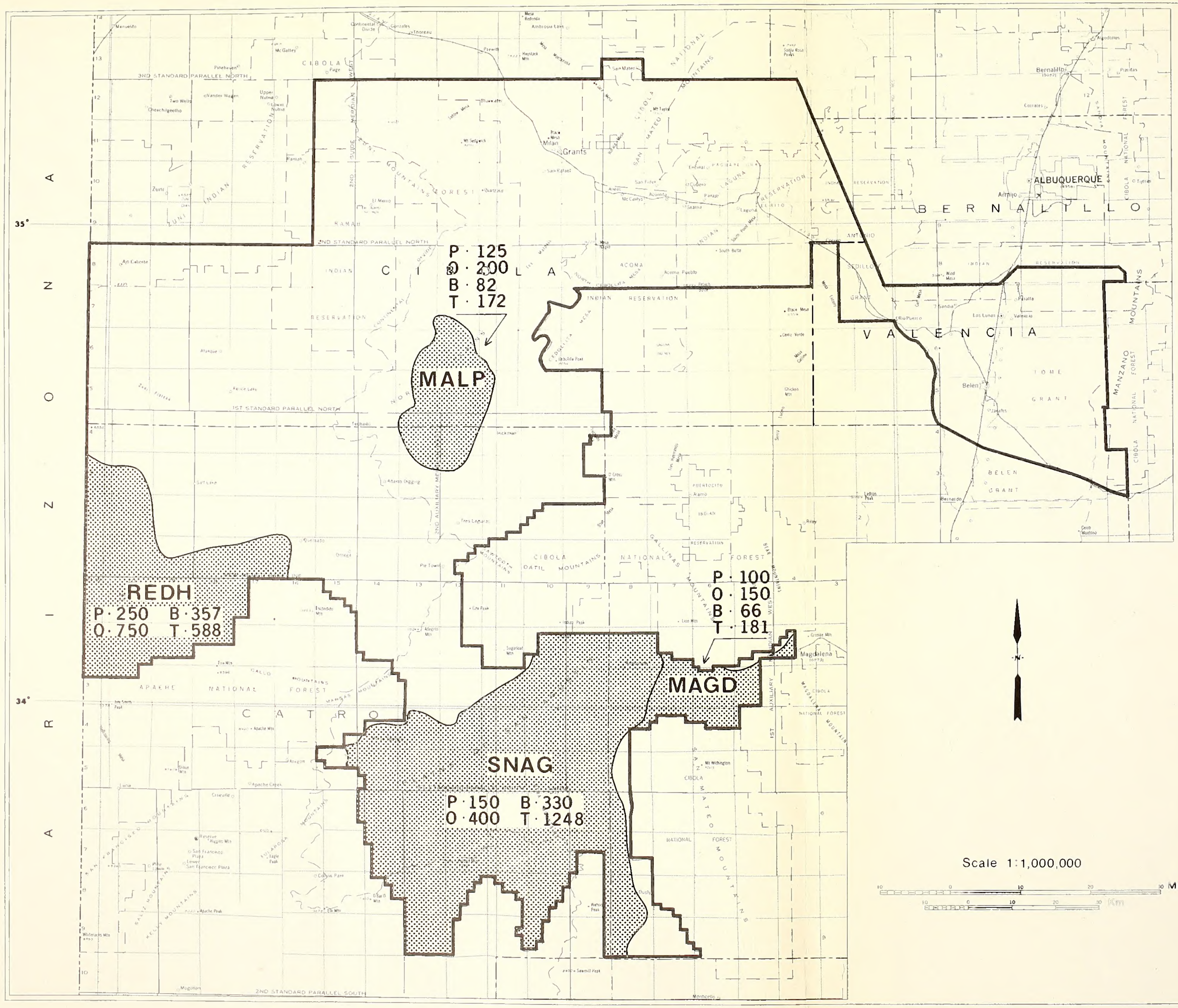
MAP II-5. Antelope Herd Units



— Divide Planning Area Boundary

LEGEND

▨ OCCUPIED ANTELOPE HABITAT WHICH CONTAINS PUBLIC LAND

MAGD – Magdalena Herd Unit
MALP – Malpais Herd Unit
REDH – Red Hill Herd Unit
SNAG – San Augustine Herd Unit

HERD POPULATION – Population numbers represent herd sizes in population density areas

P – Present
O – Optimum
B – BLM Sections
T – Total Sections

Sources: New Mexico Department of Game & Fish, BLM Socorro District Planning/EIS Files

TABLE II-6

ENDANGERED SPECIES OF THE DIVIDE PLANNING AREA

Species Name	Status	Occurrence
Black-Footed Ferret Mustela nigripes	FE&SE-I	Unconfirmed
Bald Eagle Haliaeetus leucocephalus	FE&SE-I	Confirmed
American Peregrine Falcon Falco peregrinus anatum	FE&SE-I	Confirmed
Baird's Sparrow Ammodramus Bairdii	SE-II	Unconfirmed
Sonora Mountain Kingsnake Lampropeltis pyromelana pyromelana	SE-II	Unconfirmed

FE-Federal Listed
SE-I-State Listed Class I
SE-II-State Listed Class II

Source: Federal Register. Thur., July 4, 1977. Part V: and Endangered Species Handbook for New Mexico. 1978.

Black-footed Ferret - The black-footed ferret (Mustela nigripes) is listed as Federally Endangered and State Endangered Group I. In New Mexico, 13 black-footed ferret have been collected and documented since 1899 (Dimas 1980 unpublished). Since 1969, there have been at least 20 reports of the ferret in New Mexico with various levels of reliability, ranging from "probable misidentification" to "definite." The nocturnal and crepuscular activity pattern of the ferret may partially account for the infrequent observations. Prairie dog populations may be on the upswing in the west as a result of restrictions on the use of poisons on public land. The probable die-offs of prairie dogs from sylvatic plague (Pasteurella pestis) may be limiting prairie dog populations in New Mexico. The black-footed ferret is primarily dependent on prairie dogs as a prey base, although ground squirrels, invertebrates, and reptiles are sometimes utilized (Snow 1972).

The Zuni prairie dog (Cynomys gunnison zuniensis) occurs in the DPA; although, the exact number of prairie dog towns within the DPA is unknown. It is estimated that at least 50 dog towns are present in the DPA, with one town exceeding 1,200 acres. A visual survey was utilized for 483 acres of prairie dog town in the vicinity of El Malpais (Egbert 1979 unpublished). An additional 600 acres of prairie dog towns received a cursory ocular reconnaissance approximately 40 miles northwest of the town of Quemado (BLM Socorro District Planning/EIS Files). No conclusive evidence of ferrets was found in conjunction with the occurrence of prairie dog towns.

Bald Eagle - The bald eagle (Haliaeetus leucocephalus) is listed as Federally Endangered and State Endangered (Group I). The southern United States population of bald eagles has suffered a decline in recent years which has been attributed to habitat loss, poisoning, and reproductive loss resulting from the use of chlorinated hydrocarbons as pesticides (Snow 1973). The breeding population in New Mexico has been historically low and is currently thought to be nonexistent (Hubbard et al. 1979). New Mexico does, however, provide wintering and migration habitat for bald eagles. Pramsteller et al. (1980 unpublished) reported 134 bald eagles as being observed during the 1980 mid-winter bald eagle survey for New Mexico. Most winter observations of bald eagles in New Mexico are in association with perennial streams, rivers, or other bodies of water which provide an adequate prey base. However, Connor (1980 unpublished) estimated 15 to 20 bald eagles to be wintering on upland range sites within the BLM Socorro District.

Four locations have been identified within the DPA that annually contain wintering bald eagles. Public land is found within three of these areas (Pelona Mountain, Quemado, and Railroad Canyon), and contains two identified eagle roosts. The major use period is during the months of January, February, and March. Carrion from dead livestock, rabbits, and ground squirrels is the most likely prey base for these wintering populations.

American Peregrine Falcon - The American peregrine falcon (Falco peregrinus anatum) is listed as Federally Endangered and State Endangered (Group I). Peregrines are known to nest, winter, and migrate through New Mexico (Hubbard et al. 1979). No peregrines are known to be nesting in the DPA nor are there any historical records of nesting in this area. Two ground surveys have been conducted in the DPA. El Malpais, located within the DPA was surveyed by Egbert in 1979. The whole DPA was surveyed by LGL Ecological Research Associates, Inc. in 1980. No evidence of peregrine falcon nesting was observed. LGL (1980 unpublished) reported the observation of four falcons on the DPA during the period of August through October of 1979. An aerial survey of potential nesting habitat on April 7, 1980, resulted in no sightings and a determination of nonsuitable habitat, except for the Sawtooth Mountains which had a marginal potential as nesting habitat (Hubbard et al. 1980 unpublished).

The importance of the DPA for wintering and stopover during migration has not been determined. It is doubted that the area would be a candidate for critical or essential habitat.

Baird's Sparrow - The Baird's sparrow (Ammodramus bairdii) is a State endangered (Group II) listed species. The sparrow was once a common grassland species, and its numbers have been declining for the last several years. The Baird's sparrow breeds from Prairie Provinces southward to North Dakota and adjacent states; migrates through

Great Plains and southwest to winter in Texas, Arizona, and adjacent Mexico (Hubbard et al. 1979). The bird formerly migrated through New Mexico almost Statewide. It is currently found in New Mexico in small numbers and very locally during migration, although winter sightings have been recorded.

This retiring ground sparrow is found in habitats ranging from desert grassland, to prairies, and mountain meadows, during migration. The food consists of seeds and insects, with grass seeds probably being the most important item (Hubbard et al. 1979).

The reasons for the sparrow's decline are probably related to the effects of drought, agriculture, and grazing where the species breeds. The grazing and drought probably had similar effects on the migration and winter habitat.

The present populations in New Mexico and Arizona are limited to maybe six areas (Hubbard 1982). Although there is one unconfirmed observation of Baird's sparrow, it is doubtful that the sparrow occurs within the DPA.

Sonora Mountain Kingsnake - The Sonora mountain kingsnake (Lampropeltis pyromelana pyromelana) is a State endangered (Group II) listed species. The subspecies pyromelana range includes Arizona, New Mexico, and Mexico. It occurs peripherally in New Mexico, within the counties of Hidalgo, Grants, and Catron. A recent discovery of this snake near Chloride, New Mexico, indicated a range extension of this snake across the Gila National Forest (Price 1982). It ranges in the mountains from chaparral and pinyon-juniper woodland upward into pine/fir forests. The snake is generally found in canyon bottoms with grass swales, and near subaquatic vegetation (Hubbard 1982). Their food consists of lizards and probably snakes and small mammals.

The kingsnake has not been recorded in the DPA, and it is unclear if the snakes range extends that far north. The higher elevations of Pelona Mountain and Horse Mountain areas are suitable habitat and could contain the snake (Price 1982). The secretive nature of the snake makes it difficult to determine its presence.

The greatest threat to this snake is wanton killing and unnecessary collecting. It is not clear if the snake population is suffering from a loss of habitat. The range extension of this snake across the Gila National Forest would indicate that this snake is more widely distributed within New Mexico than originally thought.

Riparian

Riparian vegetation or habitat within the DPA is considered as a special habitat feature and not as an SHS. This is due to the fact that the majority of the approximately 2,500 acres of riparian habitat located on the public lands of the DPA occur as 1- to 2-acre areas associated with wells, springs, and stock tanks. The exceptions to this have been discussed in the SHS descriptions. The importance of these relatively small riparian areas to the DPA's wildlife cannot be overstated. These areas provide waterfowl and shorebird nesting and resting habitat, forbs and browse for big game, and cover for small birds and mammals. The edge created within the SHS's by riparian vegetation provides the habitat diversity necessary to support wildlife species diversity. Presently a majority of these riparian areas are being overused by domestic livestock. A result of this overuse by livestock is the absence of vegetation around some wells, springs and stock tanks, and a deterioration in water quality at these sources (BLM Socorro District Planning/EIS Files).

LIVESTOCK GRAZING/MANAGEMENT

Introduction

There are 187 grazing allotments in the DPA utilized by 156 livestock operators. The grazing allotments consist of intermingled private, State, and public lands generally not fenced separately. Nineteen livestock operators have a U.S. Forest Service (FS) grazing permit adjacent to their BLM grazing permit. Eight of these livestock operators rotate the livestock grazing between the FS allotment and other inholdings including the BLM permit. The other eleven livestock operators have yearlong grazing operations or graze yearlings on their FS-BLM allotments. The balance of the livestock operators in the DPA have yearlong grazing operations on BLM administered public land.

Several livestock operators, particularly in the Quemado, New Mexico area, have grazing allotments in Arizona consisting primarily of private, State, and FS permit with some Section 15 BLM leases. The livestock are frequently rotated between the New Mexico and Arizona allotments.

Table E-2 in Appendix E lists the existing allotments and land status by management category. Visual A illustrates the location of allotments within the DPA and lists allotment names. Table I-4 lists allotments, Federal grazing preference, and 14-year licensed use.

Normally the forage provides the nutritional requirements of livestock. The minimum protein requirement for dry pregnant cows is 5.9 percent, and for lactating cows it is 9.2 percent (Herbel et al. 1974). However, during dormancy or drought the vegetation does not supply the nutritional requirements of livestock. The chemical composition and digestibility values indicate that supplemental feeding may be necessary during certain months to provide the nutrient requirements of grazing livestock (Nelson et al. 1968). It is a normal livestock management practice in the DPA to supplement protein during these periods when vegetation does not supply the nutritional requirements of livestock.

Livestock Operations

Twenty-one allottees graze yearlings on a seasonal basis from approximately May 1 to November 1. The yearlings are purchased either locally or from out-of-state as 350-450 pound weaner calves. In an average year, yearlings usually gain around 1-1½ pounds per head per day during the summer grazing season.

There are 22 allotments consisting of cow/calf/yearling operations. This type of operation provides more flexibility and enables an operator to keep a base cow herd during drought years and to take advantage of high forage-producing years by holding the calves over as yearlings. There may also be an economic incentive for keeping weaner calves through the winter particularly if the fall calf market is low.

One hundred forty-three allotments consist of cow/calf operations. The cow/calf herds consist primarily of Hereford, and cross-breeds utilizing Hereford, red and black Angus, Simmental, Charlais, Brangus and Brahma breeds. Several livestock operators have registered cow herds including horned and polled Hereford, Brangus, Angus, and Galloway. One livestock operator grazes Scotch Highland cattle on his allotment. The cow/calf breeding program in the DPA generally consists of turning bulls in April 15 - June 1 until September or October. Calving dates are generally February through June and shipping is in October or November. Approximately 16 allotments have yearlong breeding programs and a few allottees ship cattle year-round. Contacts with livestock operators in the DPA reveal that weaning weights in the DPA average around 430 pounds for steers and 405 pounds for heifers. The calf crop percent, expressed as cows exposed to breeding, for the DPA averages 87 percent. Several livestock operators pregnancy test their cattle and cull the unbred cattle. This practice is becoming more essential in view of the high interest rates and high feed costs. Many of the livestock operators purchase bulls from quality registered breeders to upgrade their herds and keep the top heifers for replacements.

Most of the livestock operators also graze saddle horses on the allotments. One small allotment consists of five horses grazing yearlong.

Grazing Use

Table II-7 illustrates grazing use of allotments within the DPA.

TABLE II-7

GRAZING USE BY MANAGEMENT CATEGORY

Management Category	Continuous Grazing	Seasonal Grazing 4/1-11/1	Seasonal Grazing 11/1-4/1	Grazing System	Total
A	0	0	0	0	0
B	15	11	4	44	74
C	0	0	0	0	0
D	5	2	0	16	23
E	0	3	0	11	14
F	12	2	3	59	76
TOTAL -	32	18	7	130	187

Source: BLM Socorro District Planning/EIS Files

The allotments utilizing seasonal grazing are primarily yearling operations or grazing use is in conjunction with a FS permit or another allotment in Arizona. Livestock grazing is rotated among pastures on many of these allotments. Some seasonal allotments lack adequate fencing and water developments to facilitate a grazing scheme.

The grazing systems used by 130 allotments vary from a best pasture or seasonal suitability concept to deferred rotation grazing. The registered breeders in the DPA utilize several pastures in order to keep performance records on sires and dams, breeding dates, and calving dates. All of the livestock operators utilizing some type of grazing system maintain a high level of flexibility in their grazing system to compensate for drought, spotty rainfall patterns, poisonous plant problems, market fluctuations, etc.

Major Factors Affecting Livestock Production

Major factors affecting livestock production in the DPA are drought, livestock distribution, periodic white grub infestation, and high operating expenses.

There is a close relationship between forage production and climate, particularly precipitation. Rainfall records show that most areas of New Mexico are characterized by more years of below average rainfall than above average (Ragsdale et al. 1979). Regardless of the intensity and duration of the droughts, they are the most important factor regulating consistent forage production and management for range livestock producers in the western United States. Droughts, particularly of three or more consecutive years, can change species composition, vegetation cover, herbage production, and can reduce range condition seriously despite past or present grazing management (Martin 1975). Pieper and Donart (1979) found that drought also influences plant vigor and mortality. During drought or high/low temperatures, forage quality may be so low that lactating cattle cannot consume enough to meet their requirements for lactation plus body maintenance (Herbel et al. 1974).

Cow/calf producers in their ranch operations manage first for a high conception rate for the cows and then a high weaning weight for the calves. Frequent and prolonged droughts tend to lower conception rates, calf weaning weights, and also lower the daily weight gain for yearlings due to the nutritional quality of the forage. Drought necessitates the purchase of additional supplements to meet the nutritional requirements of lactating cattle. The duration and intensity of the drought determines the amount of supplements purchased to maintain the breeding herd or the need to sell a portion of the breeding herd. "A fact of life to be faced in the fall of a drought year in the semidesert range is that substantial forage growth is not to be expected before mid-July of the next year. Since the first expected period of rapid forage growth is at least 8 to 10 months away, and there is less than a 50-percent chance that the next years' forage crop will be as good as average, the reasonable decision following a summer drought is to cull more severely than usual" (Martin 1975).

Livestock distribution is another factor affecting livestock production. Poor distribution is evidenced by areas of uneven utilization in pastures or a change of range condition within a range site. Livestock move over any pasture in response to number and location of water places, distribution of plant species within the pasture, topography, and size of pasture (Herbal et al. 1974). The livestock operator is not obtaining full use of the available forage and therefore not receiving additional returns through increased livestock production. Proper distribution of grazing is essential for efficient use of grass-shrub ranges (Martin 1975). The most common methods for improving livestock distribution in the DPA are additional waters, additional fences, salting or supplementing away from water, herding, changing breed of livestock, grazing yearlings in lieu of or in addition to cow/calf, or changing season-of-use to take advantage of seasonal palatability changes in various species, etc.

A notable problem affecting livestock production in the DPA is periodic white grub (Phyllophaga spp.) infestation. The adult of the white grub is the June beetle. Little is known about the ecological conditions or mix of conditions required for the adult beetles to lay their eggs. Hewitt et al. 1974 state that when the damage caused by the white grub is only moderate, it may be attributed to drought or poor soil fertility. Most white grub have a 3-year cycle while some require only one and others as many as 4 years. The white grub in the DPA were in the adult stage in 1978 and again in 1980. This indicates a 2-year life-cycle.

The New Mexico Department of Agriculture conducted a survey on 700,000 acres of intermingled land status in 1980. The survey indicated that 245,000 acres were infested by the white grub of which 70,000 acres were severely damaged. Huddleston (1980) stated that this was one of the largest known infestations of the white grub.

There were small areas infested by white grub prior to 1978 but these were limited to a few acres in size. These areas have revegetated themselves and it is expected that a grazing system would help speed up the revegetation process. The white grub causes damage to vegetation, principally the grasses, by eating the roots.

Another major factor affecting livestock production is the increase in the operating costs of a ranch unit. Today's livestock operator has to be more efficient and intensify his operation to overcome the "cost-price squeeze" of livestock production to remain in the ranching business (Ragsdale et al. 1979). Inflation and high interest rates are the principal causes of increased operating costs. This prevents the livestock operator from constructing new rangeland improvements because they are no longer cost beneficial. Normal operating costs such as gas, oil, insurance, veterinary bills, etc., have escalated due to inflation while the price received for products has not kept pace. High interest rates for operating expenses, land, livestock, and equipment have also adversely affected livestock production.

CULTURAL RESOURCES

Because of the large amount of public land (986,092 acres) within the DPA, a comprehensive survey to identify all historic and cultural properties that might be eligible for inclusion in the National Register of Historic Places was impossible. However, prior to the preparation of the West Socorro Rangeland Management Program EIS, BLM Socorro District, was instrumental in the preparation of Class I overviews, as well as designing a Class II sample survey to evaluate the potential effects of rangeland improvements on cultural resources. The Class I and Class II studies were in conformance with the Livestock Grazing and Range Improvement Program Programmatic Memorandum of Agreement entered into by BLM, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers (SHPO) (January 1980).

Two Class I overviews existed when the sample survey was designed. One was prepared by the School of American Research (Marshall 1976). The other was prepared for the joint BLM overview series (Berman 1979). Two other overviews prepared later in this same BLM-Forest Service (FS) series, Mount Taylor Overview (Tainter and Gillio 1980) and the Central New Mexico Overview (Tainter and Levine 1981), cover the remaining parts of the DPA. To supplement this Class I information and to prepare the planning documents needed for long-term management commitment, the BLM District and Area Offices established a cultural resources data base including site forms, published and unpublished reports and overlay maps showing survey areas and site concentrations. Access to this specific data is available to qualified individuals and institutions by contacting the Area Manager of the San Augustine Resource Area Office (SARA), BLM, 198 Neel Avenue, Socorro, New Mexico 87801.

For cultural resources inventory purposes, four planning units (Pelona, Driveway, Quemado and El Malpais) were assessed. Rather than sample the entire DPA, a decision was made by BLM to conduct a 10-percent stratified random sample of the old Quemado Planning Unit. El Malpais had received two cultural resource reconnaissance surveys conducted by the School of American Research (Beal 1976) and the Museum of New Mexico (Wiseman 1974). It was evident from these two surveys that site density (from 25 to 50 sites per square mile in some areas) was high enough to warrant Class III inventories for any surface disturbing actions. As far as the actual lava flow itself was concerned, several factors were considered in deciding that subsequent Class II inventories were not warranted. First, a similar lava flow surveyed for the East Socorro Grazing EIS proved to be twice as costly as any other environments or ecozones surveyed simply because of the difficulty of traversing such rough terrain (Richard 1981). Second, because of the fact that very little relief existed in the lava flow, topographic maps normally used in surveys [U.S. Geological Survey (USGS) 7.5 minute series] were of little or no value in plotting exact locations of sites. Also, compass use was often hampered by erratic magnetic readings caused by concentrations of materials containing iron in the lava. The cost of obtaining low level aerial photography needed to overcome some of these problems was not considered to be economically viable. Lastly, the fact that the lava flow would be given consideration in a wilderness EIS, resulted in the decision to eliminate El Malpais from any Class II survey for this EIS.

The Driveway Planning Unit consisted of a concentration of public land only along the old Magdalena Livestock Driveway boundary. The land form and soils associations showed little variation in the grassland environment that was often part of a stabilized sand dune situation. Marshall's (1976) Class I data showed that Paleo sites were known to exist in this area in the 1950's. This information was based on the field expertise of geologist Dr. Bob Weber, and one could expect these same sites and others like them to be next to impossible to find in the usual Class II surface survey (Weber 1981). The cultural resource survey conducted by New Mexico State University (Bussey and Beckett 1974) for the Very Large Array (VLA) seemed to support this. The Driveway Planning Unit was not considered further for inclusion in the research design for the Divide Class II survey.

Pelona Planning Unit was a rather large area for which little cultural resource information existed. For this reason, a 3-week reconnaissance of the area was conducted in the spring of 1979. Though the information was never formally reported, BLM archaeologists discovered only 11 sites (9 historic homesteads or associated historic features, 1 historic grave and only 1 prehistoric site). On the basis of low site density regarding prehistoric sites or settlement patterns, it was decided to exclude the Pelona Planning Unit from the pending Class II survey.

The Quemado Planning Unit fell within an area surveyed by the Upper Gila Expedition (Danson 1957). This survey revealed a high site density, especially of Tularosa Phase pueblos. The exact locations for all but a few of the sites discovered during this reconnaissance were lacking. Hence, site-specific information for the Quemado Planning Unit was all but nonexistent. This last planning unit under consideration also fell within the rather neglected Mogollon-Anasazi Interaction Sphere. This fact alone made the Quemado Planning Unit a natural candidate for the Class II survey.

Contracted to the University of Tulsa, a Class II inventory of the Quemado Planning Unit was designed on the basis of a random 10-percent sample stratified on soil associations. Sixty-one sections were surveyed in the summer of 1979 by three field crews under the direction of Dr. Michael Whalen. (In-field monitoring of the project was conducted by SARA Archaeologist Bill Kight. A close working relationship with all field personnel permitted compliance procedures that assured more accurate survey information.) Though no report was ever written (it was not part of the contract) the data from the Quemado survey has been entered into the Laboratory of Anthropology (LA) Archaeological Records Management System (ARMS) computer. It must be emphasized that such data has its limitations. This becomes especially evident when only trends can be plotted, but not predictions of site density. By stretching such data to its limits, some observations become apparent. It should be added that as a result of the Quemado survey, land managers are better equipped to deal with cultural resource values in the DPA than ever before.

The planning process resulted in the final stages of the MFP, a multiple-use analysis that recognized cultural resources for their own intrinsic value. As a result of this multiple-use analysis, 19 cultural resources have been identified in special management categories. Of these 19 sites, Bat Cave, the Dittert Site, and the Cox Ranch Pueblo are now on the National Register of Historic Places. The other 16 sites would be submitted to SHPO for a determination of eligibility to the National Register of Historic Places. Those sites on public land administered by the BLM Socorro District would be fenced, signed, and closed to off-road vehicle (ORV) use to prevent impacts resulting from livestock grazing and other resource uses, thereby preserving them in place.

BLM would conduct project-specific field inventories (Class III studies) of areas that would be impacted by range management activities prior to their implementation. If historic or cultural properties are identified, every effort would be made to avoid adverse effects. However, where this is not possible BLM would consult with the SHPO and the Advisory Council on Historic Preservation in accordance with the Programmatic Memorandum of Agreement by and between BLM and the Council, dated January 14, 1980, which sets forth a procedure for developing appropriate mitigative measures to lessen the impact of adverse effects.

The archaeological survey data recorded by the BLM Socorro District Quemado Class II Survey was coded into the LA, ARMS. Cross-tabulations of site size, site condition, environmental variables, cultural affiliation, and chronology were computed to identify trends in the land-use history of the sample survey area. These summary tables and explanations of the trends they illustrate are contained in Appendix F.

VISUAL RESOURCES

The DPA visual resource analysis was conducted on three planning units: Malpais, Driveway, and Quemado. Landscape character of the Malpais Planning Unit can be described as sandstone rock sculptured by water and wind erosion, large flat valleys cut by steep erosive drainage channels and surrounded by mesas, cinder cones containing a steep "blown out" side and a gentle rounded side, and lava flows of irregular pattern and uneven landscape. A variety of vegetation is produced within varying elevations. Round low-lying, dark green pinyon-juniper is broken by gray, yellow, and gold clumps of deciduous shrubs and the vertical line of ponderosa pine. Accents of white aspen can also be seen as it contrasts with dark lava.

Landscape character of the Driveway Planning Unit is characterized by the San Augustine Plains. The Plains are a large expanse, 60 miles long (northeast to southwest) and 20 miles wide, of two prehistoric lakebeds and are today an area of great scientific interest and a place of solitude. This vast expanse of short grassland prairie is surrounded by smooth rolling hills grading upward to distinct isolated mountain peaks over 9,000 feet high. The grasses of the San Augustine Plains appear coarse and pastel green and brown, the hills are velvet smooth and yellow-brown, and the mountains are a heavily forested dark blue.

Landscape character of the Quemado Planning Unit can be described as containing large (massive) sandstone and basalt, long extended alluvial mesas, and canyons created by uplift overlayed with volcanic debris and transformed by erosion. The lack of much vegetative variety may be the major element in the visual appearance of the Unit. Pinyon-juniper, small shrubs and soft grasses dominate, closely following the flow of the landscape. Their texture and beige and soft green color both soften and unify the Unit, merging hills and plains together.

During the 1977-80 inventory of Visual Resources of the DPA, the BLM Socorro District developed tentative Visual Resource Management (VRM) classes. The VRM class assigned to an area depends upon three factors:

1) The inherent quality of the scenery;

2) the visual sensitivity, which expresses the volume of viewers and their attitudes toward changes in the landscape character; and

3) the distance zones, from which the landscape character is being viewed.

Each VRM class describes a different degree of modification allowed in the basic elements of a landscape. For each class, the primary character of the landscape would be retained regardless of the degree of modification. Table II-8 shows the minimum management objectives for each class and Map II-6 illustrates VRM Class areas within the DPA as they were categorized during the aforementioned inventory.

TABLE II-8

MINIMUM MANAGEMENT OBJECTIVES

Class	Objective
I	Includes the most sensitive visual resources. Class I modifications allow essentially no change in the landscape to be viewed by the public.
II	Changes in any of the basic elements(form, line, color, texture) caused by a management activity should not be evident in the landscape. A contrast may be seen, but should not attract attention.
III	Contrasts to the basic elements caused by a management activity may be evident and begin to attract attention in the landscape. The changes, however, should remain subordinate in the existing landscape.
IV	Contrasts may attract attention and be a dominant feature in the landscape in terms of scale. However, the changes should repeat the basic elements of the landscape.
V	This class is applicable to disturbed areas where BLM has an opportunity to improve the scenic quality by modifying visual intrusion.

Source: BLM Socorro District Planning/EIS Files.

In addition to the inventory data, the VRM classes can reflect management considerations. Each Wilderness Study Area (WSA), for example, is managed as a VRM Class II area. Should a WSA be designated as a Wilderness Area by Congress, it would be managed as a VRM Class I area.

WILDERNESS

The Federal Land Policy and Management Act (FLPMA) of 1976 directs the BLM to prepare an inventory of the public lands and their resources, including the identification of areas having wilderness characteristics. To carry out the wilderness mandate of FLPMA, BLM has developed a wilderness review process consisting of three phases: Inventory, study, and reporting to Congress.

During the wilderness inventory phase, the BLM Socorro District examined the public lands, with public participation, and identified those areas that meet the definition of wilderness established by Congress (the area must be over 5,000 acres, appear natural, and possess outstanding opportunities for solitude or a primitive and unconfined type of recreation).

In the DPA those lands totaled 198,550 acres in eight WSAs. They have all been found to possess the mandatory wilderness characteristics and are now being evaluated under the study phase to determine if wilderness is the most suitable use for them.

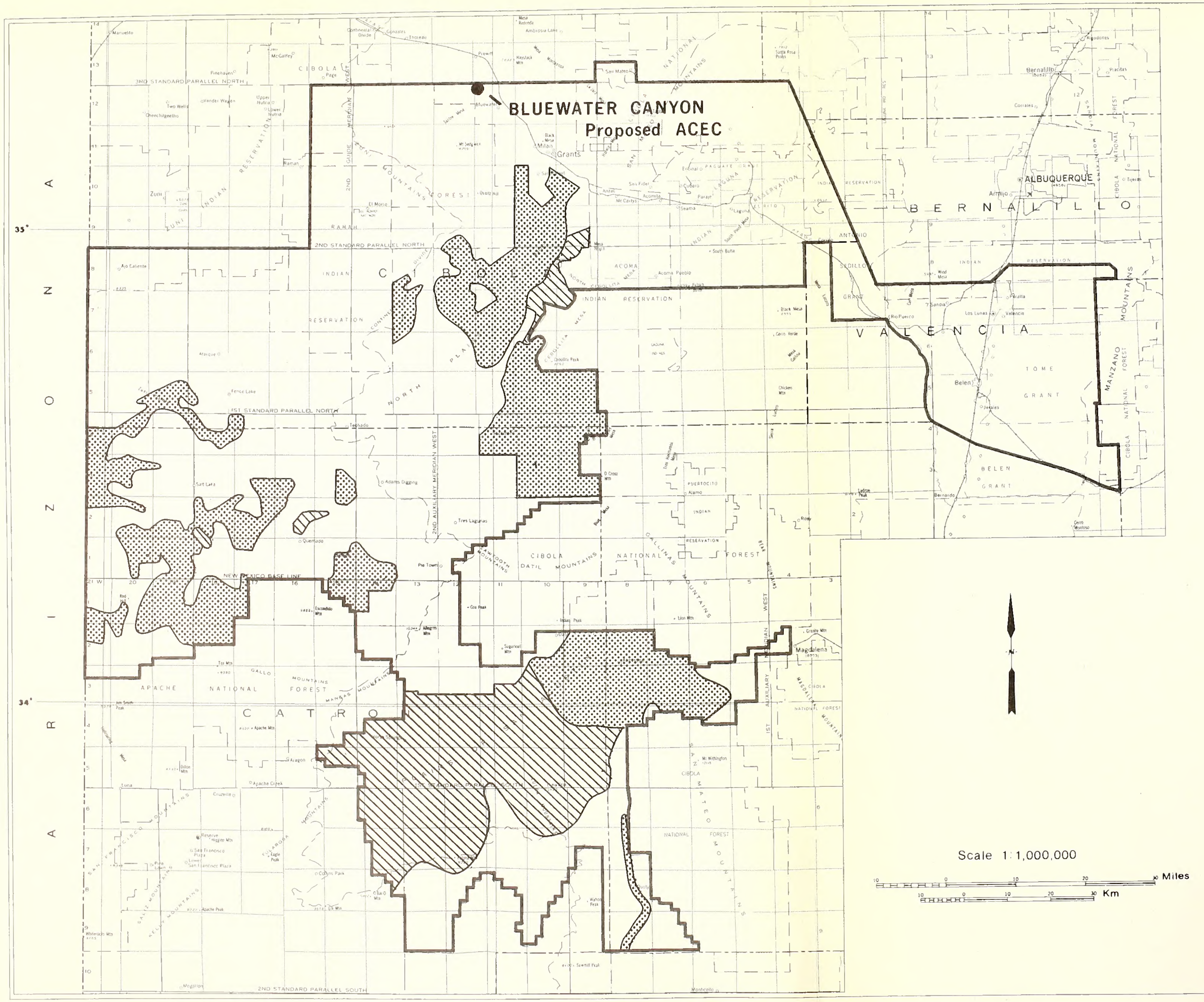
In addition to these eight WSAs, the DPA contains El Malpais instant study area. An accelerated wilderness review process for this 157,640-acre area has determined that 98,369 acres are suitable for wilderness designation and has produced a Draft EIS to support that proposal (BLM Socorro District Planning/EIS Files).

It is expected that the suitability or non-suitability of the other eight WSAs will be determined by 1984. BLM in New Mexico would then make recommendations through the Secretary of the Interior and the President to Congress. The final decision on permanent wilderness designation for each WSA belongs to Congress.

In the DPA the following nine areas are under Wilderness Review:

1) El Malpais 98,369 acres (Proposed for Wilderness Designation)

The Malpais Lava Flow has been recognized by USGS as one of the classic volcanic areas in the United States. El Malpais consists of four distinct lava flows which covered the McCarty's Valley at different times within the last 500 to 3,000 years. Lava features in the area include volcanic craters, pressure ridges, spatter cones and lava tubes. Permanent ice formations occur in a few of the lava tubes which are collapsed and sealed at one end. Associated with the lava flows are forested areas of Douglas fir, ponderosa pine, aspen, pinyon and juniper.



U. S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
SOCORRO DISTRICT OFFICE
SAN AUGUSTINE RESOURCE AREA

WEST SOCORRO
RANGELAND MANAGEMENT PROGRAM
ENVIRONMENTAL IMPACT STATEMENT

MAP II-6. Visual Resource Management Class Areas and Proposed ACEC

—— Divide Planning Area Boundary

LEGEND

VRM CLASSES

▨ CLASS II
Changes in any of the basic elements should not be evident.

░ CLASS III
Changes in the basic elements may be evident, but should remain subordinate.

☐ All Other Areas — CLASS IV
Changes may subordinate the original composition, but must reflect a natural occurrence.

● PROPOSED AREA OF CRITICAL ENVIRONMENTAL CONCERN (ACEC).

Source: BLM Socorro District Planning/EIS Files

2) Rimrock (NM-020-007) 29,430 acres

Landforms in Rimrock include open grassland, rugged box canyons, sandstone cliffs and the basalt rimrock of Cebollita Mesa. Vegetation varies from blue grama grass and pinyon-juniper to ponderosa pine and Douglas fir. High scenic values result from the impressive sandstone formations which include 500 foot high cliffs and the largest natural arch in New Mexico. Elevations in the unit vary from 6,900 to 8,300 feet.

3) Sand Canyon (NM-020-008) 8,320 acres

4) Little Rimrock (NM-020-009) 9,540 acres

5) Pinyon (NM-020-010) 13,160 acres

Sand Canyon, Little Rimrock and Pinyon WSAs are contiguous, separated by roads, and are similar in land form and resource values. These three units represent a maze of sandstone mesas, ridges and canyons covered by pinyon-juniper, ponderosa pine and gambel's oak. Blue grama is the dominant grass species. Elevations vary from 7,100 feet in the western portions of the area to 8,200 feet in the higher portions of the Pinyon Unit.

6) Mesita Blanca (NM-020-018) 19,440 acres

Mesita Blanca is characterized by flat to rolling grasslands broken by isolated sandstone and basalt mesas. The Red Hill Cinder Cone and its associated 2,000-acre lava flow are dominant topographic features. Elevations in the unit vary from 6,400 to 7,700 feet.

7) Eagle Peak (NM-020-019) 43,520 acres

Eagle Peak contains well-defined canyons, sandstone and basalt cliffs, a series of cinder cones and lava flows. Cerro Pomo, one of the cinder cones, is a dominant topographic feature in the unit. Vegetation includes open grasslands and old growth pinyon-juniper woodlands. Elevations in the unit vary from 6,400 to 7,550 feet.

8) Horse Mountain (NM-020-043) 5,140 acres

Horse Mountain is an isolated 9,450 foot high mountain which rises above the western edge of the San Augustine Plains. The unit contains extensive semi-pure ponderosa pine forests with Douglas fir, pinyon-juniper and oak scattered through the understory. The 2,500 foot elevation difference between the peak and the surrounding plains and the forested mountain environment combine to produce high scenic qualities.

9) Continental Divide (NM-020-044) 70,000 acres

Continental Divide is a diverse unit with land forms ranging from rolling grasslands to mountain peaks and 1,200 foot escarpments. Vegetation varies from ponderosa pine with scattered stands of Douglas fir, aspen and limber pine to pinyon-juniper woodlands and vast expanses of rolling blue grama grasslands. The Continental Divide bisects the unit, crossing Pelona at an elevation of 9,212 feet.

The entire 356,190 acres of land under wilderness review in the DPA must be managed to preserve existing natural values according to the non-impairment standards set forth in the BLM's Interim Management Policy and Guidelines for Lands Under Wilderness Review (1979). Management under the non-impairment standard protects Congress' right to make the designation decision by preventing actions that would pre-empt that decision.

It is unknown at this time which WSAs will be recommended to Congress as suitable for wilderness designation. Under present laws, all of the areas must be managed under the non-impairment standard until they are released from WSA status by Congress.

RECREATION

The DPA contains a wide variety of both dispersed and developed recreational opportunities. The majority of recreational use (approximately 30,000 visitor days or 77 percent of the total) consists of dispersed activities. These activities are independent of recreational developments, and offer freedom of recreational choice with a minimum of regulatory constraints. The most popular activities are ORV use (both as an end in itself and in support of other activities), hunting, camping, picnicking, hiking and various kinds of sightseeing.

The area south of Grants, which includes the Malpais lava flow and the volcanic and sandstone landscapes surrounding the lava flow, receives the heaviest dispersed recreational use in the DPA. Other areas offering outstanding opportunities are Horse and Pelona Mountains, and the lands north and west of Quemado.

The Datil Well Campground is the only developed recreation area in the DPA. The campground provides overnight camping facilities, including water, toilets, and covered picnic shelters as well as hiking trails and sightseeing opportunities. Information from site registers indicates approximately 9,000 visitor days a year at the campground (this represents 23 percent of the total recreational use of the DPA).

Developed recreation areas which once existed on the periphery of the Malpais lava flow have been closed due to vandalism. These sites included the West Historical Site which has been completely closed and the Sandstone Bluffs. The developments at the Sandstone Bluffs have been removed but the access road remains. The area is still used by sightseers, hikers, campers, and picnickers and is planned for redevelopment when supervisory personnel become available.

Another form of recreation occurring within the DPA is mule deer hunting. The current mule deer population, estimated at 2,200 animals, resulted in 4,164 visitor days attributed to deer hunters in the DPA in 1980 (See BLM Socorro District Planning/EIS Files for documentation on hunting visitor days).

OTHER LAND USES

Domestic livestock grazing is the principal use of the public lands within the DPA, yet a variety of other land uses occur on these lands. Other land uses include, in part, recreational activities such as ORV use, hiking, hunting, sightseeing, rock collecting, picnicking, and camping.

The public lands within the DPA are also used for public purpose-oriented activities, such as rights-of-way for communication sites, petroleum product pipelines, electric transmission power lines, roads, and telephone lines. Recreation and public purpose leases for sanitary landfills and recreation sites are existent within the DPA.

The great majority of public lands within the DPA are open to mineral production and exploration, while mineral materials are often extracted from these same lands. Geologic research operations are frequently being conducted on these public lands as well as an assortment of temporary use activities aimed at increasing energy production.

All of the above mentioned current uses and potential future uses are compatible with the livestock grazing industry and pose no known conflict for the continued use of these public lands for grazing purposes.

Roads and highways are the major means of transportation within the DPA. Nearly all goods and services are transported in and out of the DPA via Interstate Highways 25 and 40, U.S. Highways 60, 66, and 85, State Highways 53, 32, 12, 6, 52, 78, 117 and 36, and numerous county roads. Traffic is greatest along the interstates, as I-40 crosses through the northern portion of the DPA and services the Grants/Milan population center, while I-25 extends north to south along the eastern portion of the DPA and services the population centers of Belen and Los Lunas. Generally, physical access is adequate throughout the DPA. Access on some of the unpaved State and county roads is often limited due to poor weather conditions.

Legal access has not developed into a serious concern; however, the potential exists for future public access problems where non-public roads cross State or privately-owned lands. Many of these roads remain open to the public, but the public has no assurance that private landowners will not begin to lock gates and limit access to public lands. An example of this developing problem is the friction caused between landowners and mining interest groups when access has become blocked to Federally-owned minerals under a private surface.

The Santa Fe Railway Company provides freight rail services within Valencia and Cibola Counties. Currently, there is no rail service for the Socorro and Catron County portions of the DPA. An area south of Belen serves as the State's major switchyard and rail freight terminal, as the east/west line which services the Grants/Milan area, and intersects with the north/south line servicing the Belen/Los Lunas area.

Ten public airports are located within the DPA, which primarily service ranching operations. These are generally considered primitive, since most of them offer no lighting or facilities. The Grants/Milan airport is the only exception, as it offers a hard surfaced runway, lighting, a rotating beacon and radio advisory.

BLM has been instrumental in providing rights-of-way for many of these transportation systems, and will undoubtedly be asked to provide additional rights-of-way for future transportation systems as resource activities grow within the DPA.

AREAS OF CRITICAL ENVIRONMENTAL CONCERN (ACEC)

FLPMA mandated the BLM to identify and protect public lands which contain significant natural or cultural resource values. Congress defined these "Areas of Critical Environmental Concern" as areas "... within the public land where special management attention is needed to protect and prevent irreparable damage to important historical, cultural, or scenic values, fish and wildlife resources, or other natural systems or processes, or to protect life and safety from natural hazards."

The DPA MFP identified Bluewater Canyon (Map II-6) and surrounding public lands (560 acres) as the one potential ACEC in the DPA. Bluewater Canyon is a riparian zone/perennial stream which has the potential of becoming a Class A trout fishery and is the only perennial stream on public lands within the San Augustine Resource Area. As such, it represents a unique ecosystem which has value as a scientific study area. In addition to the Area's significance for wildlife habitat, the Canyon also has many cultural resource sites and has been rated as Class II VRM because of its scenic quality.

The Canyon would be designated as a wildlife ACEC during Fiscal Year 1982 and a management plan would be written at that time (for more details of the ACEC process, see Areas of Critical Environmental Concern Policy and Procedures Guidelines 1980-BLM Socorro District Planning/EIS Files).

SOCIAL CONDITIONS

Description of the Social Environment

The DPA consists of, in part, four counties: Catron, Socorro, Valencia, and Cibola as described in Chapter I. Cibola was created from Valencia County on June 18, 1981, and except for the 1980 census population counts, no data is available for Cibola apart from that of Valencia. Therefore, the data for these two counties will be considered under the heading of Valencia/Cibola Counties, as indicated in Table II-9 which depicts the existing social environment by secondary social characteristics.

TABLE II-9

EXISTING SOCIAL ENVIRONMENT BY SECONDARY SOCIAL CHARACTERISTICS FOR THE DIVIDE PLANNING AREA

Indicator	Catron County	Socorro County	Valencia/ Cibola Counties	State
DEMOGRAPHY				
Pop. Size (1980)	2,720[1]	12,969[1]	30,744/30,109[6]	1,299,968[1]
Rate of Pop.[2] Change 1970-80 Avg. Annual %	2.37	3.28	5.00/5.00	2.78
Reason for[3] Pop. Change (%) Births	14.00	18.70	16.70	17.20
Deaths	7.40	7.60	5.30	6.20
Net Migration 1970-80	13.00	9.50	22.40	10.30
Pop. Size[1] Cities Villages	Reserve Div. 1,692 Reserve Vil. 439 Datil 1,284[a] Quemado Div.[b] 1,028 Pie Town 73[b]	Socorro City 7,576 Magdalena Vil. 1,022	Los Lunas Vil. 3,525 Belen City 5,617 Grants City 11,451 Milan Vil. 3,747	
Rate of Pop.[2] Change Avg. Annual % Change 1970-80	Reserve Div. 2.85 Quemado Div. 1.67	Socorro City 2.95 Magdalena Vil. 5.67	Los Lunas Vil. 26.23 Belen City 1.65 Grants City 3.06 Milan Vil. 6.86	
Pop. Proj.[4] Avg. Annual % Change				
1980-90	1.77	3.20	3.23	2.15
1990-2000	1.59	-0.40	-0.41	1.57

TABLE II-9 (continued)

EXISTING SOCIAL ENVIRONMENT BY SECONDARY SOCIAL CHARACTERISTICS FOR THE DIVIDE PLANNING AREA

Indicator	Catron County	Socorro County	Valencia/ Cibola Counties	State
Rural Pop.[5/] (%) 1970	100	52	66.50	30.20
Pop. Density[5/] 1970-Persons per sq. mile	0.30	1.50	7.20	8.40
Median Age[7/] Years	31.30	22.90	21.60	23.90
Pop. 65+[5/] 1970 (%)	12.30	7.70	5.60	6.90
% 65+ in[8/] Labor Force-1970	51.20	21.30	38.60	33.60
Sex Ratio[7/] (Male to Female)	103.71	107.59	100.00	97.22
Race/Ethnic[19/]				
% White	60.40	36.80	30.10/24.00	29.90
White-Span. Origin	28.70	45.30	50.80/37.40	43.80
American Indian	1.50	9.60	2.60/25.10	12.60
Other	9.00	6.80	15.70/12.80	12.80
% Families[8/] with Children less than 18-1970	51.70	60.50	66.60	62.20
EDUCATION				
Median School[8/] Years Completed-1970	10.09	11.00	11.30	12.2

TABLE II-9 (continued)

EXISTING SOCIAL ENVIRONMENT BY SECONDARY SOCIAL CHARACTERISTICS FOR THE DIVIDE PLANNING AREA

Indicator	Catron County	Socorro County	Valencia/ Cibola Counties	State
Avg. Daily[9] Membership Change (%)- 1975-76/ 1979-80	2.75	-11.48	6.76	-2.82
Pupil Dropout[10] Rate (% for Districts Avg.)[c]	8.80	11.00	7.90	8.60
Pupil Mobility[10] Rate (% for Districts Avg.)	32.45	21.17	25.80	27.50
ECONOMIC				
Civilian[11] Unemployment Rate (%)	12.90	7.80	9.50	6.90
Total Per[12] Capita Income- 1979	$5,107	$5,876	$6,764	$7,482
% Change[12] 1978-79	31.00	16.10	13.50	38.40
Rank in State[12] in Terms of 1979 Per Capita Income	29	24	16	N/A
Median Family[13] Income-1969	$6,558	$6,357	$7,609	$7,845

TABLE II-9 (continued)

EXISTING SOCIAL ENVIRONMENT BY SECONDARY SOCIAL CHARACTERISTICS FOR THE DIVIDE PLANNING AREA

Indicator	Catron County	Socorro County	Valencia/ Cibola Counties	State
PUBLIC SERVICES				
Pupil-Teacher[10/] Ratio 1978-79[c/]	17.30	20.47	21.21	18.31
Hospital[15/] Beds/1,000 Pop. 1975	0.00	4.60	1.30	4.10
Physicians[15/] 1,000 Pop. (Civilan Only 1976)	0.43	0.71	0.48	1.54
Critical[15/] Medical Shortage Area 1977	No	Yes-East Side	Yes-Los Lunas	N/A
Critical[15/] Dental Shortage Area 1977	Yes	Yes	Yes	N/A
SOCIAL ORGANIZATION				
Resid. Stability[8/] % of Pop. 5+ not moving for 5 yrs. 1965-70	56.27	61.15	59.10	49.71
% of Persons[8/] Less than Poverty Level-1969	17.00	34.40	20.90	22.80
No. of[20/] Violent Crimes/ 1,000 Pop. 1979	4.19	4.85	4.71	5.89

TABLE II-9 (continued)

EXISTING SOCIAL ENVIRONMENT BY SECONDARY SOCIAL CHARACTERISTICS FOR THE DIVIDE PLANNING AREA

Indicator	Catron County	Socorro County	Valencia/ Cibola Counties	State
Police[5] Protection 1,000/Pop. 1977 (FBI Standard: 20)	2.40	1.90	1.70	1.80
Public Social[17] Sev. Per Capita Amt. Financial & Food Stamps	$69.73	$172.87	$72.94	$91.96
% Pop. Buying[17] Food Stamps	12.00	28.10	10.40	14.20
Avg. No.[17] of Persons Rec. Cash Grants-Food Stamps	330	3,252	6,271	187,665
% of Pop.[17] Rec. Cash Grants	1.80	7.00	3.70	4.30
No. of[20] Property Crimes/1,000 Pop. 1979	22.72	32.29	39.43	50.24
Family[16] Stability Divorces as a % of Marriages-1979	13.80	69.00	59.00	59.30
Housing Pop.[19] Housing Unit 1980	1.97	2.67	2.74	2.56

TABLE II-9 (continued)

EXISTING SOCIAL ENVIRONMENT BY SECONDARY SOCIAL CHARACTERISTICS FOR THE DIVIDE PLANNING AREA

Indicator	Catron County	Socorro County	Valencia/ Cibola Counties	State
Mobile Homes[14/]	316	936	5,463	2,253

a/ All statistics are for the year 1980 unless otherwise noted and all figures are positive except where a minus (-) sign preceeds the number.

b/ Population unknown. Figures represent the number of registered voters on November 24, 1981. Data from Office of the County Clerk, Reserve, NM.

c/ Only information for those districts which are wholly in each county was used for calculation.

Sources:

1/ U.S. Dept. of Commerce. Bureau of the Census. 1981.

2/ Annual average percentage rates calculated by BLM staff from rates for years 1970-80 from the 1980 Census of Population and Housing New Mexico.

3/ The University of New Mexico. 1980.

4/ Wombold, L. and J. Temple. 1979.

5/ University of New Mexico. 1979.

6/ State of New Mexico. Department of Finance and Administration. Automated Data Processing Division. 1981.

7/ U.S. Department of Commerce. Bureau of the Census. 1970.

8/ U.S. Department of Commerce. Bureau of the Census. 1970.

9/ Data calculated by BLM staff from public school information from New Mexico progress. 1980 Economic Report. First New Mexico Bank Share Corp. Vol 48. p 14.

10/ New Mexico Department of Education. 1979.

11/ Employment Security Department of New Mexico. Employment Services Division. Research and Statistics. 1982.

TABLE II-9 (continued)

EXISTING SOCIAL ENVIRONMENT BY SECONDARY SOCIAL CHARACTERISTICS FOR THE DIVIDE PLANNING AREA

12/ Employment Security Department. Research and Statistics. 1981. Albuquerque, N.M.

13/ U.S. Department of Commerce. Bureau of the Census. 1977.

14/ State of New Mexico. Transportation Department. Motor Vehicle Division. 1980.

15/ University of New Mexico. Health Sciences Center. 1977.

16/ Statistics calculated by BLM staff from marriage and divorce counts from 1979 New Mexico Selected Health Statistics. Annual Report. Health and Environment Department. Health Services Division. Vital Statistics Bureau.

17/ New Mexico Department of Human Services. Income Support Division. Fiscal Statistical Section. 1980.

18/ Data calculated by BLM staff from Socorro District files.

19/ U.S. Department of Commerce. Bureau of the Census. 1981.

20/ "New Mexico Crime Reports 1979." New Mexico State Police. Uniform Crime Reports. Santa Fe, New Mexico.

Statistical data needed for complete analysis does not exist specifically for the geographical area of the DPA itself; therefore, for convenience of computation and accuracy, data by county has been used. Except for population and housing counts, the census data for 1980 has not been released; therefore the latest relevant data (see sources for Table II-9) will be used with the assumption that it is reflective of the present situation and that it is adequate to make reasonable choices. It is recognized that county data can often be misrepresentative because of the presence of large concentrations of people; however, it is not believed that the size of the cities and villages within the DPA is large enough to distort the data to a significant degree.

Valencia County is characterized as rural except for the two incorporated communities of Los Lunas and Belen. Belen had a slow growth rate during the past decade but Los Lunas had an average annual growth rate of 26.23 percent. This growth can be attributed, in part, to people moving from and commuting to Albuquerque, retirees, and real estate development. The public services afforded have not kept pace with this growth.

Cibola County is also rural except for the two incorporated communities of Grants and Milan. Grants was a small agricultural town until 1950 when uranium was discovered. Nearby Milan is a relatively new municipality having been incorporated in 1957. The Grants-Milan area experienced rapid growth which made serious demands on the infrastructure and contributed to much social disorganization. The population rates have been fluctuating for the last two years due to changes related to the declining domestic market for yellow cake. The mine and milling closures and suspended construction have contributed to significant lay-offs and a declining population.

Except for the City of Socorro, Socorro County can be described as rural. The population data for the Village of Magdalena indicates a fast growth rate over the last ten years. The construction phase of the VLA contributed in great part to this growth; however, this phase is over and the population size has actually been declining. Because the growth occurred over a number of years, rather than suddenly, the infrastructure has not been seriously disrupted and social organization has not been adversely impacted. However, there are a lot of dilapidated, empty houses, many trailer houses and some of the public services are rated as poor. Magdalena is characterized as an "economically depressed" area by some of the residents. It is estimated that 75 percent of the people there are receiving public services, either food stamps and/or cash grants.

Catron County has been described as "wide-open, rugged and beautiful and one of the nation's remaining frontiers" (Albuquerque Journal 1979). The Census Division of Reserve (the county seat), has a population of 1,692 which is over half the total population of the county. Reserve and Catron County's biggest employer is the FS. About 81 percent of Catron County is owned by the Federal and State government and mostly under the control of the FS and the BLM, and to a lesser extent, the Bureau of Indian Affairs.

The villages of Quemado, Datil and Pie Town have experienced very little growth, although some of the villages have previously gone through a "boom-bust" period related to mining. These three towns are located on U.S. Highway 60 which serves as a principal route to Arizona and thus benefit to some degree from the tourist trade, the fishermen at Quemado Lake, and hunters.

For the local people in these rural areas recreational fellowship fills an integral part of community life. The restaurants and lounges in the small villages provide a place for social gatherings and dances. The athletic contests at the school buildings also provide for social activities for the whole family. Pie Town has a festival and pie contest each year. Magdalena holds an annual Old Timers Reunion and barbecue, dances at all the lounges, a fiddling contest, a parade, street dances, and craft shows. These events provide for meeting and socializing. The Old Timers Rodeo has events for which the combined age of the contestants must be over one hundred years. The Cowbelles of Datil sponsor dances every other month.

Certain areas of Catron and Socorro Counties, which are in the DPA, played an important role during the late 1800's and early 1900's with the mining of gold and silver. As the minerals diminished and most of the people moved away, these areas became ghost towns. Today there are remains of some of these towns and there is a movement under way, particularly in Magdalena, to restore some of the old historical buildings in order to preserve some of this past.

There has been some in-migration into a few of the areas by retirees and young people who have grown tired of big cities. These are the types of people reconstructing some of the old houses and buildings.

For many years the dominance of ranching has contributed to a high status for the ranchers. Many of them are highly regarded in the communities, socially, economically, politically and historically. There is, however, an increasing demand for uses of the public land such as hunting, woodcutting, recreational activities, particularly ORV use, and for mineral exploration and development. These demands are threatening to the livestock operating population, both in terms of reallocation of resources and to their status in the community. This conflict of interest continues to increase.

In the Four-County Area, the private ownership of land is 33.74 percent with 47.39 in Federal, 11.36 in State, and 7.52 percent in other ownership (New Mexico Stockman 1977). Of the land within the DPA, the ownership is as follows:

49.86	percent private
16.33	percent BLM
20.44	percent withdrawn
13.37	percent State

This ratio of private to non-private land increases the public's dependence on decisions made by others, usually the State and Federal government, which in turn may limit the decisions the owners can make on their private land. This can, and often does, create feelings of helplessness and frustration over not having the independence to make the decisions they deem necessary and best. There is resentment among the livestock operators who say that the U.S. Government, through its "intangled Bureaucracy" is contributing to the destruction of the ranching way of life, "a great American heritage and the American Family Operated Ranch." A common saying among those people who are seeking to buy a ranch is that they want "no more than 30 percent of non-private land."

Reference is made to Table II-9 for statistics of the secondary social characteristics of the Four-County Area. In general the Area can be described as being below the State average in the following indicators: Population density per square mile, median school years completed, total per capita personal income, median family income, and number of violent and property crimes committed. This Area can also be described as being above the State average in population 65 and older, (except for Valencia/Cibola which is slightly lower) the ratio of males to females, residential stability, percent of rural population, and in the unemployment rate.

Individual county characteristics which deviate from the State average are:

Catron County has a higher and pupil mobility rate, a lower per capita amount of financial and food stamp aid (however, a lower percentage of people receiving cash grants and food stamps), a higher rate of family stability, a lower population/housing unit ratio, a higher median age rate, and a greater percent of persons 65 years and older in the labor force.

Socorro County is lower than the State average in number of people 65 years of age and older in the labor force and family stability, but higher in number of people receiving cash grants, people buying food stamps, and persons under the poverty level.

Valencia and Cibola Counties had a higher rate of people 65 years and older who are in the labor force.

In relation to public services, Catron County has no hospital and Valencia and Cibola Counties had a lower hospital bed to population ratio than the State but Socorro County is slightly above in the ratio. All four Counties have a lower physician to population ratio than the State. Also, all four Counties have a critical dental shortage.

The racial characteristics of the population of the four counties can be described as being nearly 40 percent White of Spanish Origin and nearly 30 percent White. Nearly 13 percent are American Indian while the same percent classified themselves as Other. The population counts of the Four-County Area represent nearly 6 percent of the population of the State.

The DPA consists of 187 grazing allotments with 156 livestock operators. Although complete statistical data is not available in the BLM Socorro District Planning/EIS Files, the following estimates can be made that 450 people comprise the ranch family membership and that there are 50 ranch laborers and their family members. It is also estimated that at least 60 percent of the livestock operators work full-time or part-time at another occupation, or receive income from other sources. At least 42 percent of the livestock operators live on and operate their ranches. Of the known residences of 138 operators, 13 percent live off the ranch but within the DPA (12 in Grants, 5 in Quemado, and 1 in San Rafael) and continue to operate the ranch. Thirty-one percent of the operators live outside the DPA but in an area contiguous or close to it. Of 134 operators, 29 percent live outside the State (22 in Arizona, 7 in Texas, 6 in California, and one each in Illinois, Indiana, Idaho and Maine). Neither of the two last-mentioned groups are believed to actually operate the ranch. The ranching population constitutes less than one percent of the population of the Four-County Area.

The ranching population has been decreasing somewhat in the last 10 to 20 years but the size of the ranches has gradually increased through consolidation. Many economic conditions have contributed to the decline of the ranching population as well as many social factors. For example, the above-average age of the livestock operators limits their physical involvement and the young population move from a rural to an urban setting which offers more opportunities for employment.

Ranching and mining have been the predominant industries of the DPA for approximately the last hundred years and many of the town and rural trade centers have been economically dependent on these sources of income. The major cities of the Four-County Area, Socorro, Belen, Los Lunas and the Grants-Milan area have increasingly become more independent of this income while the smaller towns and villages of Datil, Quemado and Pie Town have become more dependent. Reserve, and to some extent Magdalena, have been less dependent because of the role the government entities have played.

Social Values

Ranching Life-Style

The social values relative to the ranching style of life of the DPA residents are varied, and no single dimension seems to dominate. Several value systems are held by the livestock operators. It is estimated that 86 percent of the livestock operators hold the values typical of a "ranching" life-style, characterized by an exceptionally strong desire of independence in making decisions which affect their destiny. They also have a strong belief in "rugged individualism," a belief that each person should have freedom in his economic or occupational pursuits with minimal government regulations, and should succeed by his own initiative and through hard work. These livestock operators value working in the outdoors in a clean environment which is aesthetically pleasing. The rural atmosphere is valued and the neighbors are thought of as friendly and helpful.

About 30 percent of these livestock operators and their families have been in the livestock operating business for up to one hundred years, having inherited the ranches from their fathers and in some cases even from their grandfathers. Many of these livestock operators have never been employed off the ranch and continue in the management of their ranches. In some cases the children of these livestock operators tend to live close by after their marriages, and they expect to continue the ranching enterprise after the owner retires or through inheritance. Many feel a historical value to their life-styles. They feel they are fulfilling the pioneering efforts of earlier generations and of others who settled the West, finding a use for the land that nobody wanted. They admire those pioneer's independence and self-reliance and resent any regulation which encroaches upon or takes these traits away. These livestock operators have high prestige and status within the Area, socially, economically, politically, morally and historically.

It is estimated that 9 percent of the livestock operators hold to the livestock operator life-style more attitudinally or as a rural-ranching ethic than occupationally, because their main source of income is derived from jobs off the ranch and they depend on the ranch income as supplemental, though preferring to live on or operate the ranch and supervise the operation. It is estimated that 5 percent of the livestock operators hold values which are characterized more by urban life-styles and are interested in the ranch strictly as a commercial enterprise.

Attitudes, Expectations, Concerns, and Issues

The DPA analysis has provided much of the information contained in this section. BLM personnel from the SARA also provided additional information. The statements in quotes are actual expressions of the people.

Ranching

Many livestock operators have expressed the opinion that they are the "original environmentalists," and the "true conservationists." The week-end ranchers and the ranchers who are buying land for investment purposes are excluded from this group as it is felt that these types are the ones who destroy the land and then leave. The "true ranchers" are those whose very livelihood and the well-being of future generations depends on conserving the land and its forage. They care about the land because it is their whole way of life and livelihood. These ranchers feel they know more about the land and its livestock grazing capacity than someone who spends a day or two a year on an allotment. They feel that the "pseudo-ranchers" or "week-end ranchers" are the ones BLM needs to spend its time helping, not the "true ranchers". There is a growing conflict between big ranchers and small-time ranchers in certain areas within the DPA.

The livestock operators also fear an intrusion on the ranch lands by strangers, especially trespassers. Many of the trespassers are "pot hunters" who are illegally taking cultural artifacts, both from the public land and the private land. The livestock operators hold an intrinsic value for the cultural resources as an identification with the past. Many of them have arrowhead collections but their attitude, in general, seems to be "why do you want to go digging there"? They do not favor archaeological research and protection if BLM is to spend a lot of money. They resent the trespassing more because it affects their livestock operation than because of the artifacts. The trespassers often carry guns, leave gates open, and their ORVs damage grassland.

Other trespassers are hunters who, the livestock operators say, perform acts of vandalism; they drive through unopened gates, shoot holes through water tanks, shoot at windmills and even calves. The livestock operators fear an intrusion on the ranch lands by "hippies who might move in, camp, and live off welfare." There is also trespass by people who illegally cut wood on private as well as public land, and by cattle rustlers who have killed and butchered cattle.

All these activities, particularly the ORV use, are problems to the livestock operators who allege that vegetation is being destroyed causing additional erosion. They complain of gates being left open and the livestock getting out and property being damaged and destroyed.

Attitudes also exist among non-livestock operators that the livestock operators' attitudes and behaviors may not be altruistic, as often depicted, but selfish. This group says that the livestock operators oppose, as a matter of routine, almost all progressive environmental action which does not directly benefit domestic animals or those who keep them. They say that the livestock operators make no compromise for multiple use. There is also some resentment against the big livestock operator because they lock gates which prevents access to the public lands.

These people generally adhere to the social values of preserving the land and its scenic and natural values for the aesthetic pleasure of present generations and to leave future generations a richer heritage; preservation of archaeological sites; preservation of the land from deforestation, commercialization, urbanization; preservation of wildlife; prevention of over-grazing; an opportunity to get away from the everyday nuisances of life; and balanced development.

The Preferred Alternative of the West Socorro Rangeland Management Program EIS

Four scoping meetings on the West Socorro Rangeland Management Program EIS, presenting the Preferred Alternative and three other alternatives, were held with 21 members of the public in attendance. The consensus of opinion of the public who attended seemed to be that the Preferred Alternative was a "sensible approach", that it was "basically good", and that it was "far superior to any other District EIS proposal." The livestock operators definitely wanted to be involved in the consultation process and not dictated to during the formulation of a management plan. One of the elements of the plan, the provision for flexibility or individual variation, was liked by most.

About 30 livestock operators attended a meeting held in Datil at the request of the Socorro District Advisory Board. The purpose of the meeting was for BLM to explain the Preferred Alternative. In general, the attendees felt the new proposal was "better than anything BLM had ever formulated."

The Range Improvement Task Force, the BLM Socorro District Advisory Board, the BLM Socorro District Multiple-Use Advisory Council and others have expressed favorable attitudes toward the Preferred Alternative as well.

The Bureau of Land Management

The previously-held attitudes toward BLM as a "Bureaucracy regulating the lives of people" seems to be moderating somewhat. Livestock operators are in favor of the Preferred Alternative, the consultation process, and the range studies being conducted with their assistance. Attitudes toward the way BLM manages public land have tended to become more positive as the BLM Socorro District formulated its Preferred Alternative to reflect more of the local situation, rather than have "Washington dictate to them."

Some of the citizens think that BLM spends too much time placating livestock operating interests when their function is to serve the general public. Several citizens have asked, "Why does BLM spend 95 percent of its time dealing with ranchers for 5 percent of its income and only 5 percent of its time dealing with interests that generate 95 percent of its income"? A large number of the citizens hold the attitude that BLM personnel are inexperienced, immature, and too spatially mobile. They believe that BLM personnel are too isolated from the human environment, that they should get involved with the local people and groups, participate in their activities and be more knowledgeable about local life-styles.

Some Native American citizens have expressed concern that they want to have more involvement in BLM activities. One citizen succintly phrased this concern by saying, "Some things have been written which does affect us as people, but us being people do not have that input in a lot of these things that are written."

Some Hispanic citizens have expressed a desire that they be asked their opinions more often and that the written and oral communications should be bilingual.

Wildlife

There are somewhat mixed feelings among the livestock operators regarding wildlife. Some ranchers go out of their way to protect wildlife and others say they were managing the range before the environmental movement began and, "The wildlife was there then, we are taking care of them now." There are other livestock operators who seem to enjoy wildlife as long as it does not affect the livestock operation.

Livestock operators know that wildlife visually enhance the environment and add to the economic value of saleable land; however, they do not want BLM to spend "exhorbitant amounts of money" on wildlife. They do not uniformly want "wildlife." They like to see deer and antelope but oppose coyotes and prairie dogs as they are viewed as competitors and depredators of forage.

The non-livestock operators in general favor wildlife, especially for hunting and aesthetic values. These people say the livestock operators favor wildlife only when it "does not cost them," when it is not in competition with the cattle or when it is for their own hunting pleasure. There are complaints that the livestock operators have posted "No Hunting" signs on BLM lands. They generally favor wildlife developments but feel that the livestock operators are not for the developments unless they will benefit the livestock. The livestock operator responds by saying that any improvements that benefit livestock benefit wildlife.

ECONOMIC CONDITIONS

Structure of the Economy

An input-output approach was used to describe the structure of the economy of the DPA. This approach estimates the interrelationships between individual economic sectors (industries) in the economy and permits estimating the impact on the total economy of an expansion or contraction of a particular economic sector. The predictions of income or employment change derived from the input-output tables for the DPA should be considered as rough approximations rather than actual figures.

In 1981, the natural resource based industries such as livestock and mining formed the basis of most of the economy in the DPA - 31 percent (Table II-10). The contributing industries were: "range livestock" - $27.9 million (11.6 percent); "other livestock" - $37.3 million (15.8 percent); "other agriculture" - $5.9 million (2.4 percent); "other mining" - $2.0 million (.8 percent) and "crude petroleum" - $1.1 million (.4 percent), and "forestry and fishery" - $99 thousand (.04 percent). The livestock industry represents 12 percent of the total economy of the DPA and 37 percent of the natural resource based industry economy.

Multiplier

Income multipliers are useful for estimating the impact change one economic sector of the economy would have on the total economy. For example, an income multiplier of 1.8173 for the livestock industry indicates that a one dollar change in the wages, salaries, and other income of the livestock industry would result in $1.82 change in the wages, salaries, and other income of the economy as a whole; $1 change in the wages and salaries for producing livestock products and 82 cents change induced in the remainder of the economy as the money is spent and respent within the economy.

TABLE II-10
ESTIMATED TOTAL DOLLAR OUTPUT AND TYPE II INCOME MULTIPLIER FOR 35 ECONOMIC SECTORS

Economic Sectors (Industries) In the Economy	Dollar Output	Type II Multiplier[1/]
1. Range Livestock	27,919,140	1.8173
2. Other Livestock	37,344,334	1.6711
3. Other Agriculture	5,976,713	1.8349
4. Forestry/Fishery	99,661	1.2783
5. Agricultural Service	61,650	1.2775
6. Other Mining	2,064,219	1.1954
7. Crude-Petroleum	1,165,675	1.6039
*8. Electrical Facility Const.	1,105	1.3179
*9. New Highway Const.	1,105	1.2674
10. Railroad Const.	1,105	1.2167
11. Petroleum & Natural Gas Well Const.	1,105	1.2060
12. Mine Const.	1,105	1.2094
13. Other Const.	59,249,231	1.2925
14. Food Products	57,139	1.2359
15. Logging Camps	4,628,152	1.4313
16. Sawmills	2,240,362	1.5791
17. Other Wood Products & Furniture	20,479	1.2687
18. Printing & Publication	1,519,999	1.2666
19. Other Manufacturing	4,426,569	1.2891
20. Railroads	11,454,388	1.1826
21. Motor Freight Transportation	1,178,885	1.2847
22. Other Transportation	1,006,811	1.2152
23. Communication	5,125,379	1.2098
24. Electrical Utilities	6,211,394	1.2307
25. Other Utilities	2,840,033	1.6483
26. Wholesale	4,924,406	1.2244
27. Retail	21,106,717	1.1855
28. Finance Insurance & Real Estate	17,324,069	1.4597
29. Eat-Drinking Places	7,863,595	1.2345
30. Lodging Places	589,650	1.2706
31. Personal Services	1,847,379	1.2255
32. Business & Prof. Services	1,895,158	1.2278
33. Auto Repair	1,950,692	1.2449
34. Health Services	3,631,569	1.1869
35. Other Services	4,452,667	1.3426

1/ Type II multiplier is the ratio of the total of direct, indirect and induced income change to the direct income change. It is the amount of total change due to $1.00 increase of total outputs in the household sector of final demand.

* Sectors 8-9 were used as dummy economic sectors with minimal dollar amounts. There is no production in those industries. The dollar output assigned to those industries is insignificant and will not affect the modelling process.

Source: The DPA Input/Output Transaction Tables of the BLM Input/Output Economic Model, BLM Socorro District Planning/EIS Files.

Based on the structure of the economy, as estimated for 1981, the income multiplier for the economy in Table II-10 indicates that the "other agricultural" sector had the highest estimated multiplier at 1.8349, followed by "range livestock" industry with an estimated multiplier of 1.8173. This indicates that these two industries are important in the DPA and any adjustments in permitted BLM grazing use would have a direct impact.

The most important change in the economy of the DPA is the recent decline in growth of the uranium industry in the Grants-Milan area of Cibola County. The decline of the uranium industry is expected to experience further contraction in providing income and employment opportunities and alleviating stress in the infrastructure. However, the change in the uranium industry is expected to be primarily in the Grants-Milan area.

Economic Characteristics

Population

The DPA is a large, sparsely populated area with an estimated population of 76,542; 6 percent of the State total (U.S. Bureau of Census 1980). By subtracting county subdivisions, that do not fall within the boundaries of the DPA, it is estimated that the DPA population is 32,993, of which 15,198 live in the towns of Grants and Milan and 7,576 in Socorro.

Employment

Employment is estimated at 12,376, of which 850 (6.8 percent) are employed in two livestock industries (Table II-11). In October 1981, the unemployment rate for counties in the DPA averaged 10.1 percent compared to 6.9 percent for the State (New Mexico Employment and Security Commission 1981). Catron, Socorro, and Valencia/Cibola Counties had unemployment rates of 12.9 percent, 7.8 percent and 9.5 percent, respectively, indicating that these counties rank among the highest in unemployment in the State.

In the DPA (1979) 35.6 percent of the employment was by the government (Federal, State, and rural). On a county-by-county basis the government employed 305 (55.7 percent), of 547 employees in Catron County; in Socorro County, the government employed 1,837 (52.3 percent) of 3,514 employees; and in Valencia/Cibola Counties the government employed 3,124 (23.5 percent) of 13,372 employees.

Income

Total direct income (Table II-11) generated in the DPA was estimated at $125.6 million with $4.2 million (3 percent of the total) attributable to the "range livestock industry" and $2.3 million (2 percent) to "other livestock industry." By adding the indirect and induced income, the economic significance of the DPA is estimated at $169.5 million, with the "range livestock industry" accounting for

TABLE II-11

ESTIMATED INCOME AND EMPLOYMENT FOR THE DIVIDE PLANNING AREA, 1981

		Income	Employment
1.	Range Livestock	4,257,000	400
2.	Other Livestock	2,337,000	450
3.	Other Agriculture	508,200	864
4.	Forestry/Fishery	175,300	74
5.	Agriculture Service	344,300	29
6.	Other Mining	1,029,000	12
7.	Crude Petroleum	170,100	11
8.	Electical Facility Construction	399	2
9.	New Highway Construction	399	2
10.	Railroad Construction	399	2
11.	Petroleum and Natural Gas Well Const.	399	2
12.	Mine Construction	399	2
13.	Other Construction	21,390,000	1,327
14.	Food Products	20,930	4
15.	Logging Camps	1,057,000	74
16.	Sawmills	561,900	44
17.	Other Wood Products and Furniture	215,400	20
18.	Printing and Publication	555,100	42
19.	Other Manufacturing	1,890,000	145
20.	Railroads	4,451,000	474
21.	Motor Freight Transportation	1,218,000	76
22.	Other Transportation	584,900	55
23.	Communication	2,702,000	165
24.	Electrical Utilities	1,310,000	95
25.	Other Utilities	604,700	45
26.	Wholesale	3,151,000	235
27.	Retail	10,140,000	1,418
28.	Finance Insurance and Real Estate	4,306,000	354
29.	Eating and Drinking Places	2,839,000	690
30.	Lodging Places	234,300	44
31.	Personal Services	767,200	77
32.	Business and Professional Service	1,967,000	160
33.	Auto Repair	844,200	44
34.	Health Services	2,055,000	226
35.	Other Services	2,103,000	307
36.	State and Rural Government	39,320,000	3,350
37.	Federal Government	12,470,000	1,055
	TOTAL -	125,586,693	12,376

Source: DPA Input/Output Tables of the BLM input/output economic model BLM Socorro District Planning/EIS Files.

4.6 percent of the total. Land use, employment and income is derived almost exclusively from ranching and related activities.

Per capita personal income in 1979 was $5,915, compared to $7,150 for the State, indicating this area is one of the State's lowest in per capita personal income and it is low compared to other states in the southwest region (except Utah) and the United States (Table II-12).

TABLE II-12

PER CAPITA PERSONAL INCOME, SELECTED WESTERN STATES, 1979

Location	Per Capita Personal Income (per year)
Wyoming	$9,840
Colorado	8,939
Texas	8,493
Arizona	7,949
Oklahoma	8,150
Idaho	7,462
Montana	7,894
New Mexico	7,150
Utah	7,042
Southwest Region	8,102
United States	8,637

Source: Bureau of Business and Economic Research, University of New Mexico 1979-80.

Financial Assistance

In fiscal year 1980-81, financial, medical, and food stamp assistance payments totaled $17,406,583 for the DPA and $221,235,257 for the State. The DPA contains 6 percent of the State population and receives 12.7 percent of the State's financial assistance payments.

Characteristics of the Ranching Population

The 187 allotments in the DPA are used by 156 livestock operators in connection with ranch operations. Approximately 117 ranch operators are headquartered within the DPA or in commuting distance of their allotments. Thirty-nine have out-of-state mailing addresses. For the purpose of this study, BLM has classified these economic operations into four categories: Subsistance size categories, 81 operators, 0-69 animal units (AUs); small size category, 39 operators, 70-199 AUs; medium size category, 25 operators, 200-499 AUs; and large size category, 11 operators, 500+ AUs. An estimated 23 percent of these ranchers depend on ranching for more than 50 percent of their household income. Their dependency on public lands for grazing averages approximately 64.5 percent. Their dependency is as follows: Subsistance operators, 72 percent; small operators, 71 percent; medium operators, 60 percent; and large operators, 55 percent. Most ranch employees work on a part-time or seasonal basis.

Despite poor financial returns from ranching, as indicated in Table II-13, ranchers and members of their families choose to continue in ranching life-styles. They accept a measure of material deprivation in order to enjoy the ranching life-style. As one rancher in Quemado, New Mexico, stated, "I would rather take a $15,000 reduction in income as a result of livestock adjustments than move to the city for a $30,000 increase in income."

In 1981, all ranch operations in the DPA had an estimated $8.6 million in livestock sales (Table II-13) . The total net cash income derived from these sales was estimated to be over $5.2 million. However, when allowance is made for depreciation and other costs, income from total sales is reduced to a total net income of $695,000. Individual budgets indicate that the subsistance and small commercial operations derive a negative dollar figure when all costs are considered (Table II-13).

TABLE II-13

ESTIMATED COSTS AND RETURNS FOR REPRESENTATIVE RANCH OPERATIONS IN THE DIVIDE PLANNING AREA, 1981

Budget Items	Subsistance	Small Commercial	Medium Commercial	Large Commercial	Total
Numbers of Livestock Operators	81	39	25	11	156
Livestock Sales	7,105	35,133	84,945	415,323	8,637,870
Cash Cost	3,151	17,616	35,499	140,322	3,373,272
Net Cash Income	3,954	17,517	49,446	275,001	5,264,598
Depreciation	1,132	5,662	10,785	38,649	1,007,274
Net Income	2,822	11,855	38,661	236,352	4,257,324
1/ Other Costs	4,315	17,221	38,175	144,219	3,561,918
Return Net Income to Land	-1,493	-5,366	486	92,133	695,406

Notes: Sizes of ranches are as follows:

Subsistance size 0-69 AUMs, average 27 AUs
Small Commercial size 70-199 AUMs, average 124 AUs
Medium Commercial size 200-499 AUMs, average 295 AUs
Large Commercial size 500+ AUM, average 1,171 AUs

1/ Other costs include family labor and interest in investments other than land.

Source: BLM Socorro District Planning/EIS Files.

CHAPTER III

ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

This Chapter identifies and evaluates those impacts to the human and natural environment in the Divide Planning Area (DPA) that would result from implementation of Alternative 1 (Preferred Alternative), Alternative 2 (No Action), Alternative 3 (Elimination of Livestock Grazing), and Alternative 4 (Maximization of Livestock Forage Production). It has been determined that none of these alternatives would have measurable impact on the components of climate, geology and minerals, topography, other land uses, or areas of critical environmental concern as described in Chapter II. For this reason, no further documentation of these components appears in this Environmental Impact Statement (EIS).

Each impact is identified in a cause-and-effect relationship, including those secondary impacts having significance. The cause of an impact is related to a component of the four alternatives identified in Chapter I. The effect of the impact is related to a component of the environment described in Chapter II. The impacts discussed in this Chapter were assessed on the basis of the description of the four alternatives presented in Chapter I. This assessment took into account the design features of the alternatives and Federally required measures to minimize environmental impact. Because of the design features included in Chapter I as Standard Operating Procedures, and elsewhere, and because of the Bureau of Land Management's (BLM) commitment to implementing these design features, the impacts assessed in this Chapter are considered to be exclusively unavoidable. The absence of discussion of impacts indicates that the analyses either determined that an impact would not occur or that it would be insignificant.

The following analyses of impacts are presented by resource use and alternative. A brief summary is provided only at the end of sections containing complex or lengthy discussion of impacts. The relationship between short-term use of the environment and the maintenance and enhancement of long-term productivity for all alternatives have been discussed in each resource use, where applicable, while Irreversible and Irretrievable Commitments of Resources are combined under this heading at the end of this Chapter. Impacts of the alternatives that result in no loss of long-term productivity or causing no irreversible or irretrievable commitment of resources are not discussed.

No detailed study has been conducted to determine the energy efficiency of the four alternatives under consideration; however, some general observations are possible. Alternatives 1 and 4 would require mechanical vegetative land treatments on 118,440 acres and 182,480 acres, respectively. Prescribed burning, inherent to both alternatives, would also require energy expenditure. Alternatives 2 and 3 would require approximately the same energy expenditure; however, trespass detection associated with Alternative 3 would possibly require more energy. Implementation of Alternatives 2 and 3 would be conservative of energy when compared to Alternatives 1 and 4.

During document preparation, BLM resource specialists developed several basic assumptions and analysis guidelines to facilitate impact assessment on various environmental elements. These assumptions and analysis guidelines are as follows:

1) The BLM Socorro District would have the funds and manpower to implement the Preferred Alternative, any other alternative selected, or combinations thereof.

2) Short-term impacts are those which would occur after implementation through the year 1989. Long-term impacts are those which would still be present through the year 2000.

3) Site-specific analyses would be conducted on each grazing management system to address localized impacts (resource clearances) to assist BLM planning and decision-making and to preclude impact of desirable resource values that could be affected by treatments being considered.

4) Current uses of private lands within the DPA (if these lands are being currently utilized for grazing) would remain essentially the same. These lands are being used primarily for livestock grazing or for activities associated with ranching operations.

5) All vegetative land treatments, rangeland improvements, and management actions would be conducted exclusively on public land administered by the BLM Socorro District.

6) Increased forage production resultant from ecological range condition improvement would equitably be allocated to all resource uses.

7) AUM conversions for mule deer, pronghorn antelope and elk have been computed pursuant to BLM Instruction Memorandum No. DSC-79-66, "Pounds of Forage Consumed by Ungulates," February 7, 1979 (available for review in the BLM Socorro District Planning/EIS Files).

8) The quantity of forage allocated to big game would be sufficient to sustain the numbers of animals existing at any given time. It is assumed that forage quality would be satisfactory for big game maintenance and reproduction.

9) Wildlife would continue to utilize pastures that are being rested from livestock grazing.

10) Existing rangeland improvements would be maintained in a serviceable condition except as described in Alternative 3.

11) Public opinion expressed through the public participation/involvement process is representative of a cross-section of the public at large.

12) Existing wildlife habitat improvements would be maintained in a serviceable condition in all alternatives. Wildlife habitat improvements would continue to be implemented through activity plans in all alternatives to meet wildlife habitat program objectives.

13) The approximate annual average amount of $150,000 of range betterment funds (50 percent of those grazing fees collected and returned to the BLM Socorro District) would be available each fiscal year for rangeland improvements in the DPA. This would decrease the total expenditure of Federal funds associated with implementing alternatives described in Chapter I and elsewhere in this Chapter.

AIR QUALITY

Alternative 1 (Preferred Alternative)

Prescribed burning on 234,880 acres would be conducted only during periods that would disperse smoke, thereby causing only very short duration, minimal impacts on air quality. Prescribed burning would be done under a permit issued by the New Mexico State Environmental Improvement Division (EID). BLM is required to obtain this permit, which stipulates the conditions under which burning can be done.

Under the pinyon-juniper control and chaining, mechanical treatment, and seeding projects on 91,560 acres, air quality impacts would be minimal. These would be in the form of localized, short duration dust generation.

Under the herbicide treatment project on 26,880 acres, Graslan and Tordon 10K would be utilized. As both are pelletized, no effects on air quality would be expected.

Alternative 2 (No Action)

Impacts on air quality under Alternative 2 would be the same as those that presently exist, which are minimal.

Alternative 3 (Elimination of Livestock Grazing)

Impacts on air quality resulting from Alternative 3 would remain the same as those that currently exist.

Alternative 4 (Maximization of Livestock Forage Production)

Under Alternative 4, air quality impacts resulting from vegetative land treatments would consist of smoke and fugitive dust generation. These would be in higher concentration than the other alternatives due to greater number of acres (545,815) proposed for treatment; however, the burn would be conducted during high dispersion periods. Impacts would be minimal, localized, and of short duration.

SOILS

The following assumptions were used to calculate sediment yields for the various alternatives under consideration:

1) The sediment yield values assigned to the general soil group (Appendix A) are a weighted average of all the soil mapping units within each general soil group (Table III-1);

TABLE III-1

SEDIMENT YIELD CLASSES (YEAR 2000) ON AREAS NOT VEGETATIVELY TREATED FOR ALTERNATIVES (BY ALLOTMENT MANAGEMENT CATEGORY)

General Soil Groups	Existing				Preferred				No Action				Elimination of Livestock Grazing				Maximization of Livestock Forage Production			
	B	D	E	F	B	D	E	F	B	D	E	F	B	D	E	F	B	D	E	F
1	4	4	4	5	4	4	4	5	4	4	4	5	4	4	4	5	5	4	4	5
2	5	5	4	5	5	5	4	5	5	5	4	5	5	5	5	5	5	5	5	5
3	5	4	-	4	5	4	-	4	5	4	-	4	5	4	-	4	5	4	-	4
4	4	4	-	5	4	4	-	5	4	4	-	5	4	4	-	5	4	4	-	5
5	5	-	-	4	5	-	-	4	5	-	-	4	5	-	-	5	5	-	-	4
6	-	4	-	4	-	5	-	4	-	4	-	4	-	5	-	4	-	4	-	4
7	5	5	-	5	5	5	-	5	5	5	-	5	5	5	-	5	5	5	-	5
8	5	-	-	4	5	-	-	4	5	-	-	4	5	-	-	4	5	-	-	4
9	5	5	4	4	5	5	4	4	5	5	4	4	5	5	5	4	5	5	5	4
10	4	-	-	-	4	-	-	-	4	-	-	-	4	-	-	-	5	-	-	-
11	5	5	-	5	5	5	-	5	5	5	-	5	5	5	-	5	5	5	-	5
12	-	4	-	-	-	4	-	-	-	4	-	-	-	5	-	-	-	4	-	-
13	5	5	-	-	5	5	-	-	5	5	-	-	5	5	-	-	5	4	-	-
14	-	5	-	-	-	5	-	-	-	5	-	-	-	5	-	-	-	5	-	-
15	5	5	-	5	5	5	-	5	5	5	-	5	5	5	-	5	5	5	-	5
16	5	-	-	5	5	-	-	5	5	-	-	5	5	-	-	5	5	-	-	5
17	5	-	-	5	5	-	-	5	5	-	-	5	5	-	-	5	4	-	-	5
18	5	-	-	-	5	-	-	-	5	-	-	-	5	-	-	-	5	-	-	-
19	-	5	-	-	-	5	-	-	-	5	-	-	-	5	-	-	-	4	-	-

KEY

PSIAC Sediment Yield Classes

4 = 0.2 - 0.5 acre-feet per square mile per year (slight).
5 = 0.2 acre-feet per square mile per year (moderate).

* Does not include 42,292 acres that was not inventoried or the unallotted public land. The impacts of the vegetative land treatments are not displayed in this table but are part of Table III-2.

Source: BLM Socorro District Planning/EIS Files.

2) Changes in utilization for the land use factor of the Pacific Southwestern Inter-Agency Committee's (PSIAC) method (Appendix A) were based on changes in AUMs for the various alternatives;

3) Runoff was assumed to be the same as the existing situation for areas that would not be vegetatively treated because no runoff predictions for those areas were made in the Water Resources Section (except the Elimination of Grazing Alternative).

Alternative 1 (Preferred Alternative)

Sediment yields would increase very slightly in the long term on soils in Management Categories B, E, and F, on areas which would not have vegetative land treatments; although none of the general soil groups would change sediment yield classes (Table III-1). The sediment yield increase is due to a slight decrease in vegetative cover as more of the fair range condition area improves to good. Sod-like blue grama (common in fair range condition areas) provides better surface cover for the soil than a variety of more desirable grass species (typical of good or excellent range condition). In Management Category D, the sediment yield would decrease slightly and soils in general soil group 6 (Table A-1) would change from the slight to stable class because the vegetative cover on those soils increased slightly. The overall change in sediment yields would be insignificant. There would not be any measurable differences in sediment yields in the short term.

Sediment yield would increase approximately 11 percent (Appendix A) in the short term on 234,880 acres on areas where prescribed burning is introduced. Vallentine (1971) states that prescribed burning had little damage on soils; although, it should be avoided on steeply sloping soils or soils that are highly erosive. Vegetative cover would decrease and runoff would increase (Water Resources Section) which would contribute to an increase in sediment yields in the short term. In the long term, vegetative cover would increase, runoff would decrease, and sediment yields would decrease by approximately 21 percent.

Burning would increase the soil's susceptibility to wind erosion in the short term. There would be a temporary increase in soil temperature which would decrease soil moisture. Part of the soil mulch and vegetative cover would also be destroyed. Soils most susceptible to increased wind erosion are those with a sandy surface and few coarse fragments on the surface. There would be a decrease in wind erosion in the long term due to an increase in desirable grasses which would protect the soil surface.

Pinyon-juniper control and chaining on 37,800 acres would cause a slight increase in sediment yields in the short term due to surface disturbance of the soil and removal of protective vegetation. Sediment yields would decrease approximately 22 percent in the long term due to an increase in vegetative cover and a decrease in runoff (Water Resources Section).

There would be a slight increase in wind erosion susceptibility in the short term due to a decrease in vegetative cover. The wind erosion susceptibility would decrease in the long term as the vegetation is reestablished.

The effects of herbicide application, discing and seeding, pitting and ripping would increase water erosion on 80,640 acres in the short term for the period that vegetation has been removed or destroyed. In the long term, runoff would decrease (Water Resources Section), vegetation would increase, and sediment yields would decrease approximately 16 percent. Wind erosion susceptibility would increase in the short term as long as the soil surface remains disturbed. No significant change would be evident in the long term.

Rangeland improvements would cause local soil disturbance on 252 acres in the short term and increase runoff slightly until the cover is reestablished. Wind and water erosion would increase in the short term. There would be a reduction in sediment yields on 65 acres in the long term due to a decrease in runoff except in areas where livestock concentrate near new waters. The soils located near the water sources would have reduced infiltration rates due to being more compacted; this would increase runoff and sediment yields on very small areas. The overall change in sediment yield for each of the alternatives is displayed in Table III-2.

TABLE III-2

CHANGE OF SEDIMENT YIELD ON PUBLIC LAND
(WEIGHTED AVERAGE OF VEGETATIVE LAND TREATMENT AREAS
AND NON-TREATMENT AREAS)*

	Short Term (Percent)	Long Term (Percent)
EXISTING	(Stable) 0.2 acre-feet per square mile per year class**	
Alternative 1	+13	- 8
Alternative 2	0	0
Alternative 3	0	-11
Alternative 4	+ 4	- 5

* Does not include 13,671 acres of unalloted public land or 42,292 acres in the Malpais Planning Unit that was not inventoried.

** Existing sediment yield is actually borderline to the slight class (0.2 - 0.5 acre-feet per square mile per year class).

Source: BLM Socorro District Planning/EIS Files.

There would be an improvement in sediment yields in the long term due to an improvement in range condition on the 42,292 acres of public land that was not inventoried. The impacts for the unallotted areas would be similar to the impacts for the rest of the public land in the DPA.

Summary

Under the Preferred Alternative sediment yields would be reduced approximately 8 percent in the long term, but would increase slightly in the short term on areas that would be vegetatively treated. Wind erosion susceptibility would increase slightly in the short term on areas where the vegetation is temporarily removed or disturbed. In the long term, as the vegetation is reestablished, wind erosion susceptibility would decrease.

Alternative 2 (No Action)

Sediment yields and wind erosion susceptibility would remain the same for the No Action Alternative as the present condition except in areas near waters. Areas that are heavily utilized near waters would continue a downward trend in cover and would have a slight increase in sediment yields and wind erosion, though none of the soils would change sediment yield classes (Table III-1). Sediment yield for the 42,292 acres that was not inventoried would be 3.0 acre-feet per square mile per year or less based on the assumptions that are in the Soils, Water Erosion Section of Chapter II.

Summary

Sediment yields and wind erosion susceptibility would not measurably change from the present.

Alternative 3 (Elimination of Livestock Grazing)

There would be an approximate 11-percent decrease in sediment yields with this alternative in the long term (Table III-2). General soil groups 6 and 12 (Table A-1 in Appendix A) in Management Category D and soil groups 2 and 9 in Management Category E would decrease their sediment yields from the 0.2 - 0.5 (slight) to less than 0.2 acre-feet per square mile per year class (stable) (Table III-1). Soil on 85,223 acres would be affected. A similar rate of reduction in sediment yield would be expected on the 13,671 acres of unallotted land and on the 42,292 acres of public land that was not inventoried because of a decrease in utilization, a reduction in runoff, and an expected increase in cover. No measurable change is expected in the short term for sediment yields or wind erosion susceptibility. In the long term wind erosion susceptibility would decrease as cover increases.

Summary

There would be an 11-percent decrease in sediment yield in the long term with the Elimination of Livestock Grazing Alternative. Wind erosion susceptibility would also decrease in the long term. In the short term, there would not be any significant change in sediment yield or wind erosion susceptibility.

Alternative 4 (Maximization of Livestock Forage Production)

Sediment yields would increase approximately 8 percent (Appendix A) with this alternative in the long term in areas that would not have vegetative land treatments. Soil group 9 (Table A-1) in Management Category E changed from sediment yield class 4 to 5, soil group 17 in Category B and soil group 19 in Category D changed from class 5 to 4, although they were all a borderline situation (Table III-1). Overall, there would be a slight increase in sediment yield on the areas that would not have vegetative land treatments.

Controlled burning on 363,335 acres would increase sediment yields approximately 5 percent (Appendix A) due to an increase in runoff (Water Resources Section) and a temporary reduction in cover in the short term. In the long term, runoff would decrease and cover would increase which would reduce sediment yields by approximately 13 percent. Wind erosion would increase slightly in the short term due to a temporary decrease in soil moisture and reduction in vegetative cover and mulch. Long-term increases in grass cover would decrease wind erosion susceptibility. The greatest impacts, either negative or positive, would be on sandy surfaced soils because they are most susceptible to wind erosion.

Pinyon-juniper control and chaining on 58,238 acres would increase sediment yields approximately 5 percent (Appendix A) in the short term due to the removal of vegetative cover. Sediment yields would decrease approximately 8 percent in the long term due to a reduction in runoff and an increase in cover. There would be a slight improvement in sediment yields on the 42,292 acres that was not inventoried if the area was in its worst condition.

Mechanical treatments, herbicide, and seeding on 124,242 acres would decrease sediment yields approximately 8 percent in the long term. There would not be any significant change in the short term. The impacts from the construction of rangeland improvements would be similar to those for the Preferred Alternative.

Summary

In the Maximization of Livestock Forage Production Alternative sediment yields would be reduced approximately 5 percent in the long term. In the short term there would be an approximate 4-percent increase in sediment yields. Wind erosion susceptibility would increase slightly in the short term in areas where the vegetation is temporarily removed or disturbed. In the long term, as the vegetation is reestablished, the wind erosion susceptibility would decrease.

WATER RESOURCES

In order to assess the impacts of the Preferred Alternative and other Alternatives, the following averages and assumptions were used in calculating runoff:

1) Nomograms, graphs, curves, and equations contained in the U.S. Department of Agriculture, Soil Conservation Service (SCS) Engineering Field Manual, Chapter 2, were used to calculate runoff (BLM Socorro District Office Planning/EIS Files).

2) Average vegetative cover, hydrologic soil groups, and range sites were used in computing runoff curve numbers.

3) Average slopes of 15 percent on hilly areas and 5 percent or less on other range sites were used to calculate runoff.

4) Treatment areas are localized and treatment completed over a period of 20 years; therefore, maximum impacts are diminished over time.

Alternative 1 (Preferred Alternative)

Under the 234,880-acre prescribed burn project on Malpais, Clayey, Loamy, and Hilly Range Sites with predominantly cobbly, sandy and loamy soil types, surface runoff volumes would increase an average of 7 percent immediately after treatment and decrease an average of 10 percent over the long term. Bottomland, Savannah, and Mountain Loam Range Sites with sandy, gravelly, and loamy soil types would experience increased runoff an average of 6 percent in the immediate short term and decreased runoff an average of 23 percent in the long term.

Under the 37,800-acre pinyon-juniper control and chaining project on Malpais and Loamy Range Sites containing clayey and loamy soils, runoff would remain the same in the short term after treatment and would slowly begin to decrease up to 15 percent in the long term. Bottomland and Savannah Range Sites with loamy soils would have a decrease in runoff in the long term up to 23 percent.

Under the 80,640-acre mechanical treatments, herbicide treatment, and seeding projects on Malpais, Bottomland, Clayey, Loamy, Hilly, Sandy, Gravelly, Savannah, and Floodplain Range Sites containing cobbly, clayey, sandy, and loamy soil types, surface runoff would decrease an average of 17 percent over the long term.

Construction of rangeland improvements would cause local disturbance on 252 acres in the short term and 65 acres in the long term which would temporarily increase runoff and sediment yield until ground cover becomes reestablished. The disturbance would be slight, however, and the short- and long-term impacts (increased sediment yield and decreased ground cover) would not be detrimental when compared to the total sediment production of the DPA. Construction of 27 dirt tanks is expected to slightly decrease the volume of water entering surface water basins; and 10 additional wells would remove water from aquifers, but water losses would be minimal. Minor beneficial impacts would result as the anticipated increase in vegetative cover would locally improve infiltration rates and increase ground water supplies in some areas.

Under the Preferred Alternative, consumptive water use by livestock and big game would be 2,383 acre-feet per year increasing to 3,002 acre-feet per year in the long term, or a 21-percent increase in water consumption by the year 2000.

Alternative 2 (No Action)

Under the No Action Alternative, no rangeland improvements are proposed and authorized livestock numbers would remain constant. Neither water quantity nor quality is expected to change from the present. Livestock and big game would continue to consume 2,383 acre-feet per year of water.

Alternative 3 (Elimination of Livestock Grazing)

Under the Elimination of Livestock Grazing Alternative, surface runoff volumes on grass-juniper watersheds would decrease 19 percent in the long term on Malpais, Loamy, Hilly, Savannah, and Mountainous Range Sites with predominantly loamy, cobbly, and gravelly soil types. On watersheds with Bottomland, Clayey, and Floodplain Range Sites containing sandy and clayey soil types, runoff volumes would decrease minimally due to level or nearly level slopes and rapid infiltration in sandy areas. Reduced runoff would cause a decrease in dissolved solids and suspended sediments that would otherwise be transported by runoff water; however, amounts cannot be quantified at this time. Surface water quality would also improve through decreases in streambank erosion and reduced fecal coliform count. As ungrazed areas improve and runoff decreases, both overland flow velocities and quantities would be reduced, and peak discharge would be lowered. Groundwater quality would not be affected by this alternative.

Alternative 3 would eliminate water consumption of 2,379 acre-feet per year by livestock, while wildlife would continue to consume 4 acre-feet per year.

Alternative 4 (Maximization of Livestock Forage Production)

The Maximization of Livestock Forage Production Alternative proposes controlled burning of 363,335 acres on Loamy, Sandy, and Swale Range Sites that have loamy, sandy, and gravelly soil types. This would increase surface runoff an average of 5 percent immediately after the burn, and decrease runoff an average of 10 percent over the long term.

Under the 58,238-acre pinyon-juniper control and chaining project on Loamy, Gravelly, Sandy, and Savannah Range Sites containing loamy, gravelly, clayey, and sandy soil types, runoff would decrease an average of 16 percent over the long term.

There are 124,242 acres proposed for mechanical treatments, herbicide treatment, and seeding. These areas are located on Loamy, Sandy, Swale, Hilly, and Savannah Range Sites with predominantly loamy, sandy, clayey, cobbly and gravelly soil types. Surface runoff is expected to decrease an average of 12 percent in the long term.

Under the herbicide treatment projects, Graslan and Tordon 10K would be utilized. Water quality impacts would be minimal as both herbicides are pelletized and have a very short half-life of 2 years. Application rates would be within limits set by the State and the Environmental Protection Agency (EPA).

Construction of additional rangeland improvements would cause local disturbance, but impacts would be like those in the Preferred Alternative - slight and non-detrimental.

Water consumption by livestock and big game under the Maximization of Livestock Forage Production Alternative would be 2,383 acre-feet per year in the short term and 4,208 acre-feet per year by the year 2000; an increase of 44 percent in the long term.

VEGETATION

Impacts on the vegetative resource that would result from the Preferred Alternative or other alternatives can be divided into two separate categories. Short-term impacts would occur as a direct result of rangeland improvement construction and vegetative land treatments and manipulations. By definition, these impacts would manifest themselves from implementation through 1989. Long-term impacts would result from changes in grazing intensity and ecological response to vegetative land treatments and manipulations. These impacts would be apparent through the year 2000.

The impacts resulting from the different intensities of grazing use outlined in the Preferred Alternative or other alternatives would not be readily noticeable on all sites. Any changes resulting from these actions may be gradual and, on some sites in deteriorated ecological condition, would not be noticeable for years. In areas with better condition, proportions of plant species may change, but visual aspect would remain the same. Influence from other factors such as variations in climatic conditions would affect the rate or degree of change.

Alternative 1 (Preferred Alternative)

Under the Preferred Alternative, negligible amounts of vegetation would be disturbed or destroyed at the locations of the proposed rangeland improvements. The amount of vegetative disturbance occurring during construction would vary with the methods used. Pipelines which could be ripped in using flexible pipe would cause less disturbance than those which require rigid pipe and trenching for placement.

Additional grazing pressure would occur around the proposed new waters and in some locations as a result of new fences. Areas within one-quarter mile of new waters would be much more utilized by cattle than areas outside this radius (Pieper 1970). The impacts resulting from this additional grazing use would be offset by the reduction in use around existing waters and improved distribution of livestock which the new waters and fences would provide.

Under the Preferred Alternative, the short-term consumption of forage would not change until monitoring studies determine a balance between forage produced and forage utilized based on the proper use of each species and the relative abundance of the species being utilized on each allotment. Based on available data, monitoring studies may indicate reductions are needed on certain allotments to arrive at a stocking rate consistent with the management objective of improving the vegetative resource. Most grazing studies in the southwest show a need for a change in management along with proper stocking rates in order to obtain effective results in rangeland improvement (Cable and Martin 1964, Paulsen and Ares 1962, Canfield 1939). Specialized grazing systems have increased herbage production an average of 13 percent over continuous grazing, while reductions in livestock utilization from heavy (60 to 80 percent) to moderate (40 to 60 percent) have increased it 35 percent (Van Poollen and Lacey 1979). Reductions in use from moderate to light (20 to 40 percent) have increased herbage production 28 percent.

The long-term impact of the Preferred Alternative would be an increase in production and cover of the desirable and intermediate forage species which are preferred by grazing animals. With proper management, which allows for rest during certain critical stages of plant growth, these species could increase in numbers. Reduced grazing use increases plant vigor, thereby increasing seed production and revegetation from seedlings, rhizomes, and stolons. If these preferred and intermediate plants are the more advanced, climax species, they will outcompete the lower value ones and re-invade the site (Stoddart and Smith et al. 1975). In the DPA this situation would generally apply on most range sites (SCS Range Site Descriptions). The analysis of data from the vegetative inventory indicates that the ecological condition class; e.g., poor or fair, is not relative to total production from all species, percent vegetative ground cover, or litter. However, the data does confirm the increased percentage of desirable and intermediate forage species in the higher condition classes.

Initiation or continuation of special grazing systems such as rest rotation, deferred rotation, and best pasture would promote better livestock distribution and more even use of forage (Stoddart et al. 1975). Plant species which are more palatable in one season than in another would be protected; for if they are grazed each year during peak palatability, damage is inevitable. Martin (1978) states that the "Best Pasture System," which involves resting areas with current year production falling below that of other areas in the system, works well in regions where summer rainfall is spotty. Plants in the rested pastures are allowed to restore their food reserves and retain vigor. In northern Arizona ponderosa pine bunchgrass ranges, proper stocking rates, rotation systems, rangeland improvements, and reseeding have increased productivity and increased the porportion of the climax bunchgrass (Arnold 1950).

Grazing management under the Preferred Alternative would be based on utilization and trend studies conducted as part of the monitoring of grazing allotments. Adjustments and/or rest periods needed to bring stocking rates in line with livestock grazing capacities would benefit the desirable and intermediate forage species.

Short-term and long-term acreage changes for each ecological condition class as a result of grazing management alone in the Preferred Alternative can be projected using formulas based on professional judgment and a normal distribution of range conditions. During each year of the implementation period it is assumed that 5 percent of the total acreage in poor condition would progress to fair, 2 percent of the fair acres would change to good, and 1 percent of the good acres would become excellent. Table III-3 shows the short-term and long-term acreage projections for all alternatives.

Some range sites in deteriorated condition would not progress toward climax using improved grazing management alone (SCS Range Site Descriptions). Examples include places where virtually all the perennial forage species have been eradicated, where much soil has been lost, or where undesirable shrubs such as rabbitbrush, pinyon, and juniper have taken over. In these instances a variety of vegetative treatments and manipulations have been planned to improve range condition. The following parts of this section assess the impacts of these treatments on the vegetation. Results of the studies cited are assumed to apply for the proposed manipulations and treatments on the DPA.

Pinyon-Juniper and Rabbitbrush Mechanical Control

Invading pinyon and juniper trees would be killed by chaining and bulldozing, and stands of rabbitbrush would be rootplowed. Range sites treated would include Loamy, Rocky Mountain Loam, Sandy, Sandy Slopes, Savannah, Shallow Savannah, and Swale. These vegetative land treatments would raise all poor range condition class acreage in the DPA into fair condition class and would raise all fair range condition class acreage into good range condition class. Table III-4 illustrates the proposed number of acres to be treated.

In northern Arizona, one of the first responses to bulldozing pinyon-juniper is the rapid growth of surviving young trees, snakeweed, and rabbitbrush unless there is complete eradication or appropriate follow-up treatment (Arnold et al. 1964). The tree reinvasion is very slow once control is complete. In the same study, herbage production increased for 10 years after control from 198 pounds per acre to 690 pounds. Species which increased included broom snakeweed, western wheatgrass, threeawns, sideoats grama, and blue grama. Light slash remaining after treatment benefits blue grama, sideoats grama, and bottlebrush squirreltail even more because of protection from grazing and improved moisture conditions resulting from snow retention and reduced evaporation. Heavy slash, however, shades out grass, absorbs moisture, and makes additional mechanical treatment difficult. Burning, if needed as a follow-up treatment, would remove this slash and also kill trees missed in the original operation. Alligator juniper, an occasional constituent in pinyon-juniper, sprouts after top removal, and any mechanical control must completely uproot this plant.

Additional results from the Arnold (1964) study show that mid- and short-grasses increased slowly at least through the fifth year after control. Annuals increased during the first two growing seasons

TABLE III-3

PROJECTED ACREAGES RESULTING FROM IMPLEMENTATION OF MANAGEMENT ACTIONS (EXCLUDING VEGETATIVE LAND TREATMENTS) INHERENT TO EACH ALTERNATIVE

Condition Class	Beginning Acres	Short Term	Long Term
PREFERRED ALTERNATIVE			
Excellent	1,892	33,668	86,664
Good	441,436	468,756	493,847
Fair	446,859	390,462	315,070
Poor	8,948	6,249	3,554
NO ACTION			
Excellent	1,892	4,991	9,905
Good	441,436	441,557	449,252
Fair	446,859	440,947	431,801
Poor	8,948	8,639	8,176
ELIMINATION OF LIVESTOCK GRAZING			
Excellent	1,892	34,519	91,647
Good	441,436	494,860	541,627
Fair	446,859	363,507	262,306
Poor	8,948	6,249	3,554
MAXIMIZATION OF LIVESTOCK FORAGE PRODUCTION			
Excellent	1,892	65,293	168,123
Good	441,436	464,086	465,152
Fair	446,859	363,507	262,306
Poor	8,948	6,249	3,554

Source: BLM Socorro District Planning/EIS Files

TABLE III-4

EXISTING ACREAGES FOR PROPOSED VEGETATIVE LAND TREATMENTS

Treatment by Existing Condition Class	Preferred Alternative	Maximization of Livestock Forage Production
DISCING/SEEDING		
Fair	35,750	55,029
Poor	730	1,130
HERBICIDE		
Fair	26,342	40,504
Poor	538	833
PITTING/RIPPING		
Fair	16,934	26,211
Poor	346	535
PRESCRIBED BURNING		
Fair	230,182	356,055
Poor	4,698	7,280
PINYON-JUNIPER MECHANICAL CONTROL		
Fair	37,044	57,066
Poor	756	1,172

Source: BLM Socorro District Planning/EIS Files.

and then declined after the fifth season as they were displaced by perennial forbs. Total herbage production reached its peak 10 years after the trees were cleared. O'Rourke and Ogden (1970) found pinyon-juniper control to be the most beneficial on sites with dense overstory, higher precipitation, medium soil texture, and lower calcium carbonate percentage in the soil. Plummer et al. (1970) state that even rocky slopes exceeding 50 percent were greatly improved in amount of forage, ground cover, and retention of water from high intensity storms following mechanical control. However, if few perennial grass remnants were originally present before the trees were removed, the site would remain in a pioneer-like stage for years with such species as broom snakeweed and annual goldeneye (Viguiera annua), unless seeding is done as a follow-up (Clary 1971).

Dry bottomland range sites infested with rabbitbrush can be rootplowed at a depth of at least 5 inches to control this undesirable shrub (Rechenthin et al. 1964, Plummer et al. 1955). Other species killed include non-rhizomatous perennial grasses and forbs, and most brush species, including horsebrush. Treated areas must be reseeded in order to produce livestock forage in a reasonable amount of time.

Prescribed Burning

Prescribed burning would be practiced on a wide variety of areas to control pinyon, juniper, and undesirable shrubs. Virtually all range sites in the DPA are susceptible to woody plant invasion and would be candidates for this treatment if they are in low condition and are dominated by pinyon-juniper or shrubs. Historically, fire seems to be the controlling factor in the prevention of shrub invasion (Humphrey 1957). This treatment would change poor range condition class acres to fair and fair acres to good. Table III-4 shows the proposed number of acres to be burned.

In northern Arizona, fires in pinyon-juniper woodlands have burned uniformly on flat or rolling terrain, but left islands of unburned trees on hills and ridges where the junipers grow in a thin stand with few understory plants (Arnold et al. 1964). In wildfires and controlled burns, 70 to 100 percent of trees less than 4 feet tall were killed along with 30 to 40 percent of trees 5 to 6 feet high. The mortality for plants 8 to 10 feet tall rises to 60 to 90 percent because of collection of dead, combustible plant material at their bases. On planned and unplanned burns on pinyon-juniper and galleta grasslands with additional components of black grama, blue grama, broom snakeweed, and Russian thistle, the grasses initially decreased and then rapidly recovered. Two years later production was the same on burned and unburned areas. In the same study (Arnold et al. 1964) annuals increased and became abundant during the second and third growing seasons after the burns. Russian thistle was one of the most common forbs. During the fourth and fifth seasons the annuals decreased and were replaced by perennial forbs and half-shrubs. In the fifth season the perennial grasses were recovering, and the next stage in the secondary succession was projected to be dominated by perennial grasses or by shrubs such as rabbitbrush. Small pinyons and junipers missed by the fire grew rapidly, and the reestablishment of the original pinyon-juniper stand was predicted in the absence of additional fires. Fires can also remove heavy slash remaining from mechanical treatments. Left in place, this slash shades out the grass, absorbs moisture, and makes additional mechanical treatment difficult. In northern Arizona burns, blue grama production exceeded that of unburned areas by 38 percent after 3 to 4 years (Arnold et al. 1964).

Although burning can effectively prevent invasion of pinyon-juniper, it seems to maintain open stands of ponderosa pine while preventing dense stands of this species' seedlings (Potter and Krenetsky 1967). In this situation, the understory is primarily composed of good perennial stands of grass and forbs (Humphrey 1962). Fall burning in northern Arizona killed ponderosa pine seedlings under 4 feet tall with occasional damage to trees above sapling size (Gaines et al. 1958). Grass density was reduced about 50 percent the first year with some reduction from the original density continuing into the second year.

Plant species differ markedly in their responses to fire. Factors involved in fire resistance include season of burning and phenological stage of plant, amount of litter associated with base of plant, presence of rhizomes or underground buds, sprouting ability, reproductive ability from seed, and dispersion of seed from adjacent unburned areas. General factors affecting fire damage to all plants include temperature, wind velocity, relative humidity, moisture content of litter and grass crowns, drought conditions during or after burning, and fuel accumulation in the burn area. Burning in short- and mid-grass areas in Kansas killed broom snakeweed and temporarily reduced cover of blue grama, sideoats grama, little bluestem, and big bluestem (Hopkins 1948). During the same time, short-grass production was reduced. Galleta resisted fire damage due to being rhizomatous while black grama, a stoloniferous species, was harmed in an Arizona burn (Jameson 1962). Needle-and-thread is more susceptible than bottlebrush squirreltail because it has large amounts of leaves clustered near the base (Wright 1971). Early spring burning damages cool-season species which have made new growth more than the still dormant warm-season species (Daubenmire 1968). The following species are severely damaged by fire: Broom snakeweed, needle-and-thread, and New Mexico feathergrass (Vallentine 1971, Wright et al. 1979). The same authors state that the following species are enhanced: Indian ricegrass, junegrass, bottlebrush squirreltail, western yarrow, asters, fleabanes, goldenrod, globemallow, rabbitbrush, horsebrush, rose, and rock spirea. Annuals such as sunflower, Russian thistle, and tansy mustard are temporarily increased but decline after 2 to 3 years. Muttongrass, western wheatgrass, and mountain mahogany are slightly damaged.

Pitting and Ripping

This treatment is intended to loosen compacted soils, increase water infiltration, and break blue grama sod to let other forage species become established. Range sites involved include Bottomland, Clayey Bottomland, Floodplain, Loamy, Mountain Swale, Mountain Upland, Rocky Mountain Loam, Savannah, and Swale. Poor range condition class acres involved in pitting and ripping would change to fair, and fair acres would change to good. Table III-4 shows the proposed number of acres to be treated. Pitting and ripping initially damage the vegetation but production is soon increased. Vallentine (1971) reports a 30- to 100-percent increase in productivity with a change in species composition toward mid-grasses such as sideoats grama. Western wheatgrass also benefits except on poor condition range where weed problems can develop (Barnes 1952). On medium and fine textured soils, furrows lasted up to 24 years and increased forage production by 160 percent (Branson et al. 1966). Benefits in plant composition also lasted beyond the effective water-holding capacity of the pits. Contour furrowing showed better results on loamy and clayey loam soils than on sandy loam or clay with an increase of plant cover across a broad spectrum of soil types (Hessary and Gifford 1979). In the southwest deserts, combinations of pitting and seeding have aided seedling establishment where resident cover has been relatively sparse (Barnes et al. 1958).

Herbicide

Herbicide application would be used to control pinyon, juniper, and rabbitbrush. Range sites treated would include Clayey Bottomland, Bottomland, Loamy, Mountain Swale, Mountain Upland, Rocky Mountain Loam, Sandy, Sandy Slopes, Savannah, Shallow Savannah, and Swale. This treatment would raise poor range condition class acres to fair and fair acres to good. Table III-4 shows the proposed number of acres to be treated.

Tebuthiuron application in the southern High Plains effectively controlled broom snakeweed during the second growing season after application. Blue grama increased production and began to replace the snakeweed. However, treatment in the month of May caused significant reductions in grass production for three growing seasons (Sosebee et al. 1979). This reduction could have been related to treatment at time of growth initiation of the grasses. Baur (1978) found that many grasses and forbs were damaged by tebuthiuron when it was applied during active growth. Injury can be avoided without reducing effectiveness of treatment by placing granules in bands or a grid pattern. Mature plants of sideoats grama, blue grama, big bluestem, and switchgrass did not show decreases in production after picloram application although seedlings grew less (Baur 1978). In west Texas sand shinnery oak communities, pellets of tebuthiuron and picloram decreased the oak and increased grass yields 3 to 9 times after 2 years (Pettit 1979). Sand dropseed, sideoats grama, and false buffalograss were among the species benefiting, while purple threeawn decreased. Although good management may prolong the benefits of herbicidal control, retreatment is usually needed after a few years depending on the regenerative potential of the noxious plants (National Research Council 1968).

Discing and Seeding

This treatment would be used on deteriorated sites with little remaining vegetation or in conjunction with other proposed treatments. Range sites involved would be Bottomland, Clayey Bottomland, Floodplain, Loamy, Loamy Plains, Deep Sand, Mountain Swale, Mountain Upland, Pine Grassland, Rocky Mountain Loam, Sandy, Sandy Slopes, Savannah, and Swale. Discing and seeding would change poor range condition class acres to fair and fair acres to good. Table III-4 shows the proposed number of acres to be treated.

Seeding areas that were chained for pinyon-juniper control in northern Arizona resulted in grasses, forbs, and shrubs producing 981 pounds per acre 5 to 11 years after treatment (Clary 1971). Controls at the same place were producing 223 pounds per acre. Seeded perennial grasses increased rapidly during the first several years and then fluctuated. Native plants increased through time while the exotic lovegrasses in the seed mixture peaked after 4 to 6 years and then declined. Competition from resident annuals for shading and soil moisture can be severe unless they are controlled (Vallentine 1971). Following complete brush control in the intermountain area of Utah, seeded species reached full production potential in about 5 years (Cook 1966). If the original brush control was 60 to 80 percent, herbicidal control was required in 7 to 8 years and full production potential was delayed until 10 to 11 years after seeding. Vallentine (1971) states that success or failure of seeding has generally been directly proportional to the degree to which the original perennial vegetation was destroyed. Broadcast seeding as a follow-up to burning pinyon-juniper in northern Arizona allowed forage production of 390 pounds per acre 4 years later compared to 50 pounds per acre on untreated land (Arnold et al. 1964). Crested wheatgrass, western wheatgrass, and sand dropseed were successful species on the seeded land. Bottlebrush squirreltail, blue grama, and four-wing saltbush have also shown to be well adapted to a variety of soils and climate in northern Arizona pinyon-juniper woodland (Johnsen and Gomm 1981). Additional seeding species which can produce well in southwestern semi-arid grasslands and mountains include spike dropseed, alkali sacaton, galleta, hairy grama, black grama, slender wheatgrass, Arizona fescue, pine dropseed, sandhill muhly, muttongrass, mountain muhly, perennial bromes, sideoats grama, spike muhly, intermediate wheatgrass, orchard grass, smooth brome, and winterfat (Stoddart and Smith 1955). Many of these species are only adapted to specific soil types. Interseeding into existing grass stands where some desirable forage species remain has been successful in many cases. On the High Plains in Texas, sideoats grama was interseeded into abandoned cropland in advanced secondary succession (Willard and Schuster 1971). The species compete well against all others except buffalograss and established sideoats grama plants. Western wheatgrass and silver bluestem, two grasses originally present in the test area, became less vigorous in the treatments but were still considered in fair condition. Total production in the interseeded plots was 1,466 pounds per acre compared with 895 pounds per acre for the controls.

Threatened or Endangered (T&E) Plant Species - The candidate species in the DPA would be given the same consideration as listed species as a matter of BLM policy. Erigeron rhizomatus does not appear to be used by the livestock in the area, while Astragalus accumbens thrives in harsh soils where there is some grazing disturbance. Places where these species occur would be identified and avoided where adverse impacts would occur from rangeland improvements and vegetative land treatments. Major changes in grazing management or intensity in the habitats of the plants would also be evaluated for impacts.

Alternative 2 (No Action)

Under the No Action Alternative, the intensity of grazing use would not be changed but could increase or decrease from year to year depending upon each livestock operator's situation. Increases in AUMs of use up to the preference could occur on some allotments during some years. No changes in management would occur.

Livestock distribution and grazing patterns on most allotments would remain the same. Allotments continually grazed yearlong and overstocked would continue to have preferred forage species utilized heavily each year. Unless adequate watering facilities were available to provide uniform distribution of livestock over the entire allotment, those areas close to waters would continually be utilized heavier than those areas far from waters. Sites in a downward trend would continue to lose cover and production of climax species and acquire larger proportions of less palatable, grazing-resistant plants. Pinyon-juniper, rabbitbrush, and broom snakeweed would increase in the absence of fire, which needs healthy grass stands to carry. On the other hand, areas in upward trend or with light grazing intensity would gain more climax species at the expense of those characteristic of deteriorated situations. Exceptions would be sites with too many shrubs or too few forage plants remaining to respond to grazing management alone.

Condition class annual acreage changes under this alternative would be minimal, with 0.5 percent of poor acres becoming fair, 0.2 percent of fair acres becoming good, and 0.1 percent of good acres becoming excellent. Table III-3 shows the results of these acreage projections by implementing management actions only. Any vegetative land treatments or rangeland improvements undertaken on the allotment management plan (AMP) allotments would have the same consequences as those in the Preferred Alternative. No effect on the candidate T&E plant species is foreseen.

Alternative 3 (Elimination of Livestock Grazing)

Under this alternative, no forage on public land would be utilized by livestock grazing. Rangeland improvements not utilized by other resources would not be maintained, and no new improvements would be constructed. Condition class annual acreage changes would be 5 percent of poor acres becoming fair, 3 percent of fair acres becoming good, and 1 percent of good acres becoming excellent. Table III-3 shows the results of these acreage projections.

Vegetation response resulting from the elimination of grazing would vary according to range site and condition class. Sites with soil loss, lack of perennial vegetation, or heavy infestations of pinyon and juniper would not advance toward climax in the foreseeable future (SCS Range Site Descriptions, Potter and Krenetsky 1967). In the absence of fire, shrubs may continue to invade the better condition ranges (Humphrey 1957). Due to buildup of combustible litter, fires which are not suppressed will burn hotter and cause greater initial damage to plants (Hopkins 1948, Wright 1971). As a result, recovery time for perennial species would be longer than in similar fires where litter accumulation is less. Annuals and other species more resistant to burning would constitute a larger percentage of the species composition until the remaining plants recover.

In Arizona ponderosa pine bunchgrass range, protection favored bunchgrasses such as mountain muhly and Arizona fescue (Arnold 1950). Small amounts of grazing-resistant plants such as blue grama, dropseeds, squirreltail, and threeawns were also present along with minor amounts of perennial forbs and annuals. If both fire and grazing are excluded from these communities, dense stands of ponderosa pine seedlings would result (Potter and Krenetsky 1967). In pinyon-juniper and grassland communities, the same grazing protection study discovered increases in plant ground cover, decreases in forbs, and decreases in ponderosa pine due to grass competition against its seedlings. Lacey and Van Poollen (1981) determined from an average of 20 experiments throughout the western U.S. that protected plots had 68 ± 46 percent more production than those exposed to 40 to 60 percent grazing utilization. Individual plants had 59 ± 50 percent greater production when protected. After 4 to 7 years of non-use, herbage production did not continue to increase in most cases. Various species which would increase under elimination include western wheatgrass, bottlebrush squirreltail, sideoats grama, junegrass, wolftail, Wright eriogonum, four-wing saltbush, and Mexican cliffrose (Arnold et al. 1964). Species decreasing on most range sites include blue grama, threeawns, dropseeds, galleta, ring muhly, fringed sage, milkvetches and locoweeds, and oakbrush. Increased competition from perennial grasses also tends to control rabbitbrush growth and reproduction (McKell and Chilcote 1957).

By excluding livestock grazing altogether, beneficial results from grazing would not be realized. Holechek (1981) outlined some of the effects of controlled grazing as follows:

1) Loosening of soil surface during drying periods;

2) Incorporation of mulch into soil profile to speed humus development;

3) Nutrient recycling and increased availability in the ecosystem;

4) Trampling of seeds into the soil;

5) Reduction of excess accumulation of standing dead vegetation which chemically and physically inhibits new growth;

6) Inoculation of plant parts with saliva to stimulate regrowth; or

7) Reduction of fire, insect, and rodent problems associated with vegetation accumulation.

In addition, Stoddart et al. (1975) state that proper grazing stimulates plant growth in many cases.

Erigeron rhizomatus, a candidate plant for T&E status, would not be affected, for it is unlikely that new species would appear in the harsh clay soils of its habitat. *Astragalus accumbens*, a plant of grazed areas, would be adversely affected by increased competition from perennial grasses and other species.

Alternative 4 (Maximization of Livestock Forage Production)

Under this alternative, all allotments would be intensively managed to obtain the maximum amount of forage capable of being produced in the DPA. The number of rangeland improvements and acreages for each vegetation manipulation and treatment would be increased considerably over those in the Preferred Alternative. Annual acreage changes resulting from management actions alone for each condition class would be 5 percent of poor acres progressing to fair, 3 percent of fair acres advancing to good, and 2 percent of good acres becoming excellent. For the vegetation manipulations and treatments, the poor acres would become fair, and the fair acres would become good. Table III-4 shows the acreages proposed for the treatments. Each action or treatment would be individually evaluated for impacts on the candidate species for T&E listing.

Each individual activity would have the same qualitative effect as in the Preferred Alternative. However, the overall effects would be greater because the amounts of land involved would be more. The ultimate goal may not be a climax situation for each range site but a plant community under the climax stage. This condition would be the most practical for grazing management (Stoddart et al. 1975).

WILDLIFE

The analysis in this section is directed toward impact to wildlife habitats, specifically Standard Habitat Sites (SHS). An analysis of impact to wildlife species or groups of species known to occur in the DPA such as small birds, small mammals, big game and raptors is discussed in relation to SHS's and separately as in Chapter II. When a wildlife component; e.g. SHS, deer, raptors, etc., is not discussed under the Preferred Alternative, the impacts are assumed to be insignificant. When a wildlife component is discussed under the Preferred Alternative, but is not discussed under another alternative, the impacts are expected to be the same as the Preferred Alternative.

Anticipated impacts on ecological condition class, by alternative, are presented on Table III-5 (ecological condition class change by SHS's). Projected big game populations for each alternative are presented in Table III-6; both tables present information discussed in this Chapter by alternative.

TABLE III-5

ECOLOGICAL CONDITION CLASS CHANGE, DIVERSITY INDEX, AND VEGETATIVE DIVERSITY
BY STANDARD HABITAT SITE FOR ALTERNATIVES

		Existing Estimated Percent Condition Class					Ecological Condition Class Change (Percent)								Diversity Index by Ecological Condition 3/								Vegetative Diversity by Ecological Condition			
							Short Term				Long Term				Summer Birds				Small Mammals							
Standard Habitat Sites	Acres	Ex	G	F	P	Non 1/	Ex	G	F	P	Ex	G	F	P	Ex	G	F	P	Ex	G	F	P	Ex	G	F	P
PREFERRED ALTERNATIVE																										
Broom Snakeweed/Blue Grama, Hill	343,638	0	31	68	1	0	3	38	59	0	7	45	48	0	ND	2.08	2.39	0.47	ND	0	1.24	1.29	1.71	2.65	3.70	2.50
Rabbitbrush/Blue Grama, Hill	60,405	0	39	59	-	2	3	44	51	0	8	49	41	0	ND	1.02	1.99	ND	ND	1.15	0	ND	ND	2.72	2.72	ND
Pinyon/Juniper, Hill	392,047	0	61	29	1	9	4	61	25	1	11	59	21	0	ND	3.36	2.92	ND	ND	1.36	1.20	ND	1.86	2.85	2.86	2.47
Russian Thistle/Alkali Sacaton, Valley	37,758	0	63	31	6	0	5	62	29	4	11	61	25	3	ND	1.63	ND	ND	ND	0.56	ND	ND	ND	2.60	3.17	2.06
Four-Wing Saltbush/ Blue Grama, Valley	44,986	0	34	64	2	0	3	40	56	1	7	46	46	1	ND	1.86	1.40	ND	ND	1.09	1.30	ND	2.34	2.78	2.33	ND
Ponderosa Pine/Pinyon Pine, Lava[2/]	50,817	ND	ND	ND	ND	100	ND	ND	ND	ND	ND	ND	ND	ND	2.95	ND	ND	ND	1.38	ND	ND	ND	ND	ND	ND	ND
Ponderosa Pine/Pinyon Pine, Mountain	56,441	2	55	43	0	0	6	57	37	0	12	58	30	0	ND	ND	3.25	ND	ND	ND	1.25	ND	1.76	2.71	3.09	ND
NO ACTION ALTERNATIVE																										
Broom Snakeweed/Blue Grama, Hill	343,638	0	31	68	1	0	0	32	67	1	1	33	65	1	ND	2.08	2.39	0.47	ND	0	1.24	1.29	1.71	2.65	3.70	2.50
Rabbitbrush/Blue Grama, Hill	60,405	0	39	59	-	2	0	40	58	0	1	40	57	0	ND	1.02	1.99	ND	ND	1.15	0	ND	ND	2.72	2.72	ND
Pinyon/Juniper, Hill	392,047	0	61	29	1	9	1	61	28	1	1	61	28	1	ND	3.36	2.92	ND	ND	1.36	1.20	ND	1.86	2.85	2.86	2.47
Russian Thistle/Alkali Sacaton, Valley	37,758	0	63	31	6	0	1	62	31	6	1	62	31	6	ND	1.63	ND	ND	ND	0.56	ND	ND	ND	2.60	3.17	2.06
Four-Wing Saltbush/ Blue Grama, Valley	44,986	0	34	64	2	0	0	34	64	2	1	36	62	1	ND	1.86	1.40	ND	ND	1.09	1.30	ND	2.34	2.78	2.33	ND
Ponderosa Pine/Pinyon Pine, Lava[2/]	50,817	ND	ND	ND	ND	100	ND	ND	ND	ND	ND	ND	ND	ND	2.95	ND	ND	ND	1.38	ND	ND	ND	ND	ND	ND	ND
Ponderosa Pine/Pinyon Pine, Mountain	56,441	2	55	43	0	0	2	56	42	0	3	56	41	0	ND	ND	3.25	ND	ND	ND	1.25	ND	1.76	2.71	3.09	ND
ELIMINATION OF GRAZING ALTERNATIVE																										
Broom Snakeweed/Blue Grama, Hill	343,638	0	31	68	1	0	3	42	55	0	8	53	39	0	ND	2.08	2.39	0.47	ND	0	1.24	1.29	1.71	2.65	3.70	2.50
Rabbitbrush/Blue Grama, Hill	60,405	0	39	59	-	2	3	47	48	0	9	56	33	0	ND	1.02	1.99	ND	ND	1.15	0	ND	ND	2.72	2.72	ND
Pinyon/Juniper, Hill	392,047	0	61	29	1	9	4	62	24	1	11	62	17	0	ND	3.36	2.92	ND	ND	1.36	1.20	ND	1.86	2.85	2.86	2.47
Russian Thistle/Alkali Sacaton, Valley	37,758	0	63	31	6	0	5	64	27	4	12	65	21	2	ND	1.63	ND	ND	ND	0.56	ND	ND	ND	2.60	3.17	2.06
Four-Wing Saltbush/ Blue Grama, Valley	44,986	0	34	64	2	0	3	45	51	1	8	53	38	1	ND	1.86	1.40	ND	ND	1.09	1.30	ND	2.34	2.78	2.33	ND
Ponderosa Pine/Pinyon Pine, Lava[2/]	50,817	ND	ND	ND	ND	100	ND	ND	ND	ND	ND	ND	ND	ND	2.95	ND	ND	ND	1.38	ND	ND	ND	ND	ND	ND	ND
Ponderosa Pine/Pinyon Pine, Mountain	56,441	2	55	43	0	0	5	60	35	0	12	63	25	0	ND	ND	3.25	ND	ND	ND	1.25	ND	1.76	2.71	3.09	ND
MAXIMIZATION OF LIVESTOCK FORAGE PRODUCTION																										
Broom Snakeweed/Blue Grama, Hill	343,638	0	31	68	1	0	5	40	55	0	14	46	40	0	ND	2.08	2.39	0.47	ND	0	1.24	1.29	1.71	2.65	3.70	2.50
Rabbitbrush/Blue Grama, Hill	60,405	0	39	59	-	2	6	44	48	0	16	48	34	0	ND	1.02	1.99	ND	ND	1.15	0	ND	ND	2.72	2.72	ND
Pinyon/Juniper, Hill	392,047	0	61	29	1	9	8	58	24	1	21	53	17	0	ND	3.36	2.92	ND	ND	1.36	1.20	ND	1.86	2.85	2.86	2.47
Russian Thistle/Alkali Sacaton, Valley	37,758	0	63	31	6	0	9	60	27	4	22	55	21	2	ND	1.63	ND	ND	ND	0.56	ND	ND	ND	2.60	3.17	2.06
Four-Wing Saltbush/ Blue Grama, Valley	44,986	0	34	64	2	0	5	41	53	1	15	46	38	1	ND	1.86	1.40	ND	ND	1.09	1.30	ND	2.34	2.78	2.33	ND
Ponderosa Pine/Pinyon Pine, Lava[2/]	50,817	ND	ND	ND	ND	100	ND	ND	ND	ND	ND	ND	ND	ND	2.95	ND	ND	ND	1.38	ND	ND	ND	ND	ND	ND	ND
Ponderosa Pine/Pinyon Pine, Mountain	56,441	2	55	43	0	0	10	56	34	0	23	53	24	0	ND	ND	3.25	ND	ND	ND	1.25	ND	1.76	2.71	3.09	ND

1/ Non-range sites were not inventoried for ecological condition and are not expected to be affected by the Alternative. Non-range sites receive very little livestock use because of adverse topographic conditions or features.

2/ The SHS consists of lava non-range sites, and is not expected to be affected by the Alternative.

3/ Species diversity developed using the Shannon Index of General Diversity (Odum 1971).

ND - No Data

Source: BLM Socorro District Planning/EIS Files.

TABLE III-6

PROJECTED BIG GAME POPULATIONS BY HERD UNIT

Herd Units	Present Population	Alternative 1	2	3[1/]	4
Pronghorn Antelope					
Red Hill	250	750	250	750	750
Malpais	125	200	125	200	200
San Augustine	150	400	150	400	400
Magdalena	100	250	100	250	250
Mule Deer					
Gallup	500	1,000	500	1,000	1,000
Magdalena	1,100	2,300	1,100	2,300	2,300
Gila	600	1,200	600	1,200	1,200
Elk					
Gila	ND[2/]	100	50	100	100

[1/] Minimum increase expected is listed above; numbers are expected to increase exponentially with the Elimination of Livestock Grazing Alternative.

[2/] Exact wintering elk population figures are not known.

Source: BLM, Socorro District Planning/EIS Files, and NMDG&F Comprehensive Plan, Part 2.

Alternative 1 (Preferred Alternative)

Under the Preferred Alternative, the quality of habitats available to vertebrate wildlife species would change in ecological condition and generally provide more cover, food, and water. Changes predicted for SHS's are analyzed by comparing data between different ecological condition classes, although a change by one ecological condition class is not anticipated for all SHS's or Habitat Sites (HS's). The rangeland improvements proposed would impact the entire DPA and it is not possible to relate or discuss these impacts to a specific SHS. The proposed rangeland improvements of the Preferred Alternative are known to include: 47 miles of fence, 65 miles of pipelines, 10 wells and 27 pit tanks. Wildlife use or occupancy of the areas of the projects or treatments would be eliminated during the construction phase of these projects. The development of the wells and tanks would provide additional water for wildlife use and thus allow some species (big game) to make better use of the range. The 353,320 acres of vegetative land treatments would have similar short-term impacts on wildlife.

Impacts by Standard Habitat Site

Broom Snakeweed/Blue Grama, Hill

The improvement of rangelands in the excellent and good ecological condition classes resulting from grazing management and rangeland improvements in this SHS would result in a reduction in small mammal species diversity, an increase in summer bird species diversity and a slight improvement in pronghorn antelope habitat conditions. Data collected from the three different ecological condition classes of good, fair, and poor indicate that the small mammal diversity decreases with an improvement in ecological condition. The species composition indicates a trend to larger seed-eating rodents as the ecological condition class declined. These results agree with Monson and Kessler (1940), who noted that rodent populations increase, as overgrazing progresses. Wood (1969) indicated that the closer the grassland vegetation approaches climax, the fewer the small mammal species and population numbers the area would support. The summer bird diversity index [Integrated Habitat Inventory Classification System (IHICS), Socorro District Planning/EIS Files] indicates that the bird species diversity improves as this SHS's condition class improves toward fair condition.

The improved ecological condition would change the vegetation to increase structural diversity and composition, and would increase the types of habitat for birds. Wiens (1975) found that "high intensity grazing profoundly alters breeding avifaunas from the 'natural' state, generally in the direction of decreased species numbers and 'complexity.'" Assuming the inverse is true, then the improved ecological condition with its corresponding reduction in grazing pressure should increase the bird species number.

The antelope habitat would be improved by the increase in desirable forbs (palatable perennial forbs), that would result from the improved ecological condition.

Rabbitbrush/Blue Grama, Hill

The grazing management and vegetative land treatments proposed on this SHS would improve the ecological condition class of the majority of the SHS. The proposed land treatment of approximately 200,000 acres of rubber rabbitbrush would improve the vegetative species diversity and reduce vegetative structural diversity. Available data indicates that both summer bird and small mammal species diversity would decrease as the ecological condition improves within this SHS. The reduced vegetative structural diversity would result in a lower bird diversity. The antelope habitat would be improved by the increase in desirable perennial forbs resulting from the improved ecological condition.

Pinyon/Juniper, Hill

The grazing management and vegetative land treatments proposed on this SHS would improve the ecological condition class of the majority of the SHS. The proposed land treatment of approximately

100,000 acres of pinyon-juniper woodland in irregularly shaped plots of 100 acres or less [DPA Management Framework Plan (MFP)] would improve the vegetative species diversity of this SHS. Data collected during the inventory on this SHS indicates that as vegetative species diversity and ecological condition class improve in the pinyon-juniper woodland, both small mammal and summer bird species diversity improves.

By improving vegetative species diversity in this SHS, mule deer habitat would be improved. As was stated in Chapter II, the majority of the DPA's mule deer habitat is within the pinyon-juniper woodland. By increasing the openings and creating edge within the woodlands, more mule deer forage would be available to this species.

Russian Thistle/Alkali Sacaton, Valley

Implementation of the Preferred Alternative would improve the ecological condition of this SHS. The ecological potential of this site is not considered sufficient to significantly alter the summer bird or small mammal species diversity. An increase in ecological condition class may provide an increase in mule deer use around the perimeter of this SHS. There are no planned vegetative land treatments that would affect this SHS.

Four-Wing Saltbush/Blue Grama, Valley

Both plant species and structural diversity would increase in this SHS under the Preferred Alternative. This improved ecological condition would have differing effects on summer birds and small mammals. Summer bird species diversity would be expected to increase with an improvement in ecological condition. The small mammal species diversity would decrease as the ecological condition improves. This would agree with Wood (1969) who found rodent diversity and numbers decrease as a grassland approaches climax vegetation condition. At this time, it is not known what effect, if any, a change in ecological condition class would have on raptor use in this SHS.

Ponderosa Pine/Pinyon Pine, Lava

It is assumed that this SHS would remain in its present condition under the Preferred Alternative as well as all other alternatives. The SHS is classed as a non-range site and receives little, if any, livestock use due to the extreme ruggedness of terrain.

Ponderosa Pine/Pinyon Pine, Mountain

Although the majority of this SHS is currently in good or excellent ecological condition, the Preferred Alternative would improve the existing good and excellent condition class by improving plant vigor and production. The portion of this SHS that is in fair condition class would be improved by grazing management and vegetative land treatments. It is not anticipated that an improvement in ecological condition would affect small mammal or summer bird species diversity in this SHS. An improvement in ecological condition class would have a beneficial effect on the wintering elk population and may help eliminate the dietary overlap between livestock and mule deer on this SHS.

Big Game

Mule Deer

Improved ecological condition and reduced forage competition of the Preferred Alternative would result in improved habitat condition to support an overall increase in mule deer numbers to an estimated 4,500 deer by the year 2000 (Table III-6). The ecological condition would be improved through grazing management and vegetative land treatment. This would result in a better quality and quantity of forage available for mule deer.

Fourteen allotments were placed in Management Category B or E. In addition, 8 other allotments were moved from Management Category F to Management Category D to reduce forage competition within essential mule deer wintering and fawning areas. The season-of-use rest stipulated in Management Category B, D or E would rest the essential areas within each allotment. This would remove livestock from these areas during the crucial mule deer use period, eliminating competition for forage. Future mule deer and livestock forage competition would be reduced through the allocation of mule deer AUMs. The current level of 4,446 AUMs for mule deer utilization would increase (Figure I-1), as the deer population increases and forage becomes available.

Mule deer habitat would be further improved by pinyon and juniper control. This would be accomplished by creating small clearings of irregular edge. The clearings would provide increased forage and would maintain escape cover nearby. The control of rabbitbrush within the deer range would increase forage available for mule deer.

Pronghorn Antelope

Improved ecological conditions and reduced forage competition from the Preferred Alternative would result in an overall increase in pronghorn antelope numbers to an estimated 1,600 antelope (Table III-6) by the year 2000. The ecological condition would be improved through grazing management and vegetative land treatments. Improved ecological condition would provide a better quality and quantity of forage for antelope.

Twelve allotments were placed into Management Category B or E. In addition, 5 other allotments were moved from Management Category F to Management Category D to reduce forage competition within essential antelope forb producing and fawning areas. The season-of-use rest stipulated in Management Category D would rest essential areas within each allotment. This would remove livestock from these areas during the crucial antelope use periods, eliminating competition for the forage. Future antelope and livestock forage competition would be reduced through the allocation of antelope AUMs from the current level to 1,397 AUMs by the year 2000, as the antelope population increases and forage becomes available.

Habitat for antelope would be improved in the long term by the development of vegetative land treatments. The total acres of antelope habitat affected by these actions are not known. Portions of the 299,560 acres of pinyon-juniper, 36,480 acres of rabbitbrush control, and the 17,280 acres of pitting, contour ripping and contour furrowing would be done within the antelope habitat. These land treatments would improve forage quality and quantity available for antelope.

Elk

The Preferred Alternative would result in improved habitat condition to support the expanding elk use of an estimated 100 elk during the winter. The ecological condition from grazing management would result in a better quality and quantity of forage.

Forage competition would be reduced by the categorization of four allotments in Management Category B or D, that contain essential elk wintering area. The season-of-use rest stipulated in Management Category B or D would rest the essential areas within each allotment, and remove livestock from these areas during the elk winter use. The future elk and livestock forage competition would be reduced by the allocation of 130 AUMs to elk by the year 2000.

The elk habitat would be further improved by the pinyon-juniper control, if sufficient cover is left. The control would provide increased forage.

Raptors

The Preferred Alternative would change vegetation species and structural diversity in portions of six of the seven SHSs. The change in aspect to a grassland or shrub grassland of good to excellent ecological condition class would reduce small mammal species diversity. This reduction in the prey base could be offset by the improvements in small mammal species diversity anticipated by vegetative land treatments in the pinyon-juniper woodland. Increased ground cover, a by-product of improving range conditions, could reduce raptor hunting efficiency.

Threatened or Endangered Species

The U.S. Fish and Wildlife Service (FWS) was contacted as required pursuant to Section 7 of the Endangered Species Act of 1973, as amended. The FWS has provided the BLM Socorro District with a synopsis of Federally listed endangered and proposed listed species potentially occurring in the DPA (Appendix D). There is potential for five Federally and State endangered animal species to occur within the DPA. None of these species would be affected by the Preferred Alternative. If, during a site specific clearance a "may affect" determination is made by the staff biologist, consultation would be undertaken with the agency [FWS, New Mexico Department of Game and Fish (NMDG&F), or the New Mexico State Heritage Program] listing the species which may be affected.

The black-footed ferret, a Federally endangered and State Endangered Group I species, is dependent on prairie dog towns for food and cover. The Preferred Alternative would have no affect on prairie dog towns within the DPA.

The bald eagle and peregrine falcon, Federally endangered and State Endangered Group I species, are both seasonal users of the DPA. The roosts and food of these species would not be affected by the Preferred Alternative.

The Baird's sparrow, State Endangered (Group II) is currently not found within the DPA. Should the sparrow's population increase to the point that the species would occur within the DPA, the Preferred Alternative would have a beneficial affect by providing the sparrow with more vigorous and abundant mature grass seed heads.

The Sonora mountain kingsnake is State Endangered (Group II). The habitat of the snake is limited to mountainous areas. The detrimental factor for the snake appears to be illegal collecting. The snake would not be affected by the Preferred Alternative.

Riparian

All riparian zones within the DPA would be provided protection from over-grazing by livestock and from vegetative land treatements. This resultant initial vegetative response would improve habitat for the majority of wildlife species within the DPA. Improvement of riparian vegetation would also result in improvement to drainages and water source production areas throughout the DPA.

Alternative 2 (No Action)

The trend data available for the DPA indicates that under the No Action Alternative, there would be local variations of improving and declining ecological conditions. For purposes of analysis, it is assumed that for all SHS's ecological condition would remain constant with a net result of no change in overall ecological condition class for all SHS's (Table III-5).

Impacts by Standard Habitat Site

Broom Snakeweed/Blue Grama, Hill

The trend in vegetative condition for this SHS would remain stable with localized areas of improvement. Overall, this SHS may have a slight improvement in ecological condition by the year 2000. There would be no change in small mammal and summer bird species diversity for this SHS. The antelope population utilizing this SHS would remain stable.

Rabbitbrush/Blue Grama, Hill

Data obtained from inventories (DPA IHICS) indicates that the present vegetative trend for this SHS is gradually improving. The expected ecological condition class for this SHS would be stable with no change in small mammal and summer bird species diversity. The expected increase in ungulate demand for forage from this SHS could induce an increase in competition between livestock and antelope within this area.

Pinyon Pine/Juniper, Hill

The majority of this SHS (61 percent) is in the good ecological condition class category; present trend would indicate that this situation would remain stable by the year 2000. If this is the case, the expected demand for forage placed on this SHS by the desired increase in mule deer populations would exceed forage produced. The existing small mammal species and summer bird species diversity would remain stable.

Russian Thistle/Alkali Sacaton, Valley

This SHS would remain in poor ecological condition class under the No Action Alternative. Wildlife populations would be expected to remain stable at existing low numbers and diversity.

Four-Wing Saltbush/Blue Grama, Valley

With adoption of the No Action Alternative, this SHS would be expected to decline in habitat diversity. The continued utilization of the browse species within this SHS by domestic livestock, and increase in grass species and composition, would reduce small mammal and antelope populations use of this habitat. Summer bird species diversity would be expected to improve slightly as ecological condition class improves. The effect of this alternative on raptor populations utilizing this SHS is not known at this time.

Ponderosa Pine/Pinyon Pine, Mountain

The majority of this SHS is presently in the good or excellent ecological condition class. The indicated trend for this SHS is slightly improving through the year 2000. The wildlife populations and species diversity utilizing this habitat would be expected to remain stable under this alternative.

Big Game

Mule deer, pronghorn antelope and elk populations would be expected to remain stable with a slight upward trend by the year 2000. Existing competition between livestock and big game would remain at the current level with a slight increase correlating with changes in wildlife numbers. Overall big game populations would remain far less than at optimum numbers and habitat conditions would remain poor.

Raptors

No change would be expected in raptor populations or habitat under the No Action Alternative. The raptor prey base may increase as local rodent populations increase due to over grazing or other influences.

Threatened or Endangered Species

The No Action Alternative would not affect the listed species within the DPA.

Alternative 3 (Elimination of Livestock Grazing)

Under the Elimination of Livestock Grazing Alternative, the ecological condition classes of all SHS's would improve with a trend toward climax vegetative communities. The time required for the SHS's to reach climax vegetative communities is unknown; for purposes of this analysis it is assumed that climax communities would be nearly reached by the year 2000. Alternative 3 is expected to have the same impacts on SHS's and big game populations as the Preferred Alternative; however, the time required for changes in species diversity and wildlife populations is unknown.

Big Game

Alternative 3 would make all forage available for wildlife use and the big game species populations would be expected to increase; however, the maximum numbers of mule deer, antelope and elk that the habitat could support is not known. It is assumed that factors other than food would influence these species populations.

Raptors

With the SHS's reaching climax vegetation, the potential for a raptor prey base decline is likely. The anticipated increase in ground cover would inhibit the raptors hunting success as well as reduce small mammal species diversity and numbers.

Threatened or Endangered Species

Alternative 3 would provide the best opportunity to improve those species habitats which have become T&E due to habitat loss attributable to livestock grazing. Improved range condition class would benefit the Baird's sparrow by increasing the amount of available grass seed.

Riparian

In Alternative 3, the riparian zones within the DPA would be provided protection from overgrazing by livestock. The initial response of the vegetation would improve the habitat for the majority of wildlife species within the DPA. The improvement of riparian vegetation would result in improvement to the drainages and water source production throughout the DPA.

Alternative 4 (Maximization of Livestock Forage Production)

The primary distinction between the Maximization of Livestock Forage Production Alternative and the Preferred Alternative is the amount of acreage proposed for vegetative land treatment (an additional 192,495 acres) and the percent of allotments proposed for intensive grazing management. All impacts attributable to Alternative 4 would be the same as the Preferred Alternative except an increase in acres treated and the time frame of anticipated vegetative response. All vegetative land treatments would include wildlife considerations and would be expected to increase deer and antelope numbers.

Pinyon and juniper control on 58,584 acres and the prescribed burns on 363,986 acres would be designed to produce maximum forage for deer and/or antelope as well as livestock, while maintaining sufficient cover to enhance deer and/or antelope use. Vegetative land treatments and total allotment management would increase the rate of anticipated vegetative response. Each SHS would exhibit an increase in acreage in the excellent and good ecological range conditions with its corresponding effects on small mammals and summer birds as outlined in the Preferred Alternative.

LIVESTOCK GRAZING/MANAGEMENT

Alternative 1 (Preferred Alternative)

In the Preferred Alternative, a grazing management plan would be implemented on 74 allotments using the management actions as prescribed in Management Category B. A grazing system would be incorporated involving those pastures on 23 allotments using the management actions as prescribed in Management Category D. Fourteen allotments in Management Category E would be evaluated on range monitoring studies and management changes, if any. Seventy-six allotments in Management Category F would continue present grazing use and range studies would be established to monitor range condition and trend (Table I-3).

The need for management and the level of intensity of management are dictated largely by range conditions and range trend. Smith (1980) states that overall range conditions on the public ranges improved or stabilized as a result of management practices and improvements used on a very wide scale. Martin (1975) states that many semi-desert ranges have improved since the 1930's.

In 1976, Box, Dwyer, and Wagner compared various assessments of range conditions on public ranges since 1936. They found that in the 1936 study, 1.5 percent of the public land was in good condition; while in the 1966 study, 18.9 percent of the BLM grazing lands were in good or excellent condition. In Box's opinion (1979), the rangelands are in the best condition they have been in this century and that on the average they are improving, although they are not producing anywhere near their potential.

The SCS (1977) compared range condition estimates with similar SCS estimates made in 1963 on non-Federal rangelands. The comparison revealed that between 1963 and 1977 range condition improved markedly. An analysis of these estimates for the 17 western range states shows that range condition improved substantially on non-Federal rangelands in 13 of these states including New Mexico (Pendleton 1979).

Determining trend is highly important. Generally, stock reductions and wide scale changes in management are unnecessary if condition trend is upward; although, by improved management, rate of range improvement may be increased. Poor range condition does not mean that current management practices are wrong. Only trend of condition would reflect correctness of current grazing practice (Stoddart et al. 1975). Pieper (1979) stated that a range in poor condition but improving may not call for a change in management, while one in good condition but declining may require a change in management. The average range condition for public land in the DPA is high/fair and it is assumed that trend is slowly improving at the rate of 200 AUMs per year. Table I-4 shows the 14-year licensed use. This indicates that current use is presently below grazing preference for the DPA.

Range monitoring studies such as forage utilization, climatic data, actual use, and condition and trend would be established to monitor the direction of trend. These studies would determine the effectiveness of implementing the management actions in each management category and any management changes needed to improve range condition.

An allotment in an average fair range condition is classified as such due to a lack of species diversity. This is due in large part to season-of-use or poor livestock distribution. One way to increase range productivity is to manipulate season and intensity of livestock grazing (Herbal et al. 1974).

The minimum deferment period in the season-of-use management action would meet vegetative physiological requirements as well as allow flexibility to develop a workable grazing system during the consultation phase. Grazing systems would be designed or modified as needed to accommodate livestock management practices of the ranch. These management practices must be accommodated for a grazing system to be acceptable to the livestock operator. Above all, it should be emphasized that good judgment and common sense should control the grazing system, not the reverse. When dates are prescribed for rotating livestock, they would be considered as guidelines, not as sacred rules. Logic also implies that since the range is improving, so must response by livestock. Larger quantities of more nutritious and highly preferred plant species must surely mean better conditions for the livestock (Dwyer 1980).

Literature provides no clear consensus in supporting the contention that livestock are more productive under grazing systems than continuous grazing. Herbel (1971) noted that most of the work he reviewed showed production per animal stayed the same or was lower for rotation systems compared with continuous grazing. He further stated that to justify the rotation scheme, vegetative response should be such that range condition and thus livestock grazing capacity is improved. In most cases, this would take several years to accomplish and evaluate.

There is little information concerning the impact of grazing systems on percent calf crop. Calving percentage is probably a reflection of the overall management of the ranch and not specifically on grazing systems (Pieper 1980).

Obtaining uniform grazing distribution is one of the most important problems facing livestock operators on western ranges. Many factors such as stocking rates, topography, distance from water, and distribution of palatable species influence grazing patterns. Overgrazing on rangelands is not always caused by grazing too many animals. If stock are not properly distributed over the range, overgrazing can be severe in certain spots even with limited stock numbers. Many apparently overstocked ranges would improve without number reductions if management is adjusted to secure more uniform grazing. This may involve salting, fencing, herding, trail building, water development, or changing the kind of livestock (Stoddart et al. 1975, Dwyer no date).

Pieper (1970) conducted a study on the Fort Stanton Cooperative Range Research Station in central New Mexico which illustrated the importance of water developments on pinyon-juniper rangeland when there were sharp gradients in utilization away from existing waters. Additional forage was available for use in areas over one mile from water when utilization for the entire pasture was less than the proper utilization for the key forage species.

Placing salt and supplemental feed away from water also helps distribute livestock to lightly used areas. Various studies have shown that animals do not require, or necessarily use, salt and water at the same time. Often, they leave the salt to graze rather than go directly to water. Salt can be a relatively satisfactory distribution tool if there is little or no salt in the vegetation or no natural salt licks (Martin 1975).

Kind and class of livestock also affect livestock distribution. Generally, yearlings graze more uniformly over rough terrain than cows with calves and yearling heifers being more active than yearling steers on steep, rocky terrain. Some breeds of livestock travel further than others.

Herding and trail building improves livestock distribution by making inaccessible areas available for utilization. Season-of-use management improves livestock distribution in areas where palatability of forage species vary in certain times of the year.

Implementing season-of-use management, constructing rangeland improvements, and utilizing other techniques or methods to improve livestock distribution requires full coordination and cooperation between BLM, livestock operators, and other interested or affected parties. Each allotment is unique and the development of a management plan would take into consideration the problems, livestock management practices, and objectives of each allotment. A management plan would evolve to fit the situation of each allotment over a period of time.

The livestock grazing capacity of a range cannot be measured precisely. Forage production varies greatly from year to year as well as seasonally. Schickedanz (1979) states that true grazing capacity can only be determined through actual use records, utilization records, determining condition, and watching the trend up to ten years.

Adjusting livestock numbers on those allotments in Management Category B is an optional management action to be implemented if the other management actions cannot be agreed upon or if range monitoring studies show that distribution and season-of-use management fails to improve range condition. The monitoring studies on those allotments in Management Category E would determine the need for any livestock adjustments. In the event that livestock numbers are adjusted downward, the proposed livestock grazing capacities listed in Table I-4 would be used to determine a top and bottom figure to begin consultation and arrive at an initial stocking rate with the livestock operator.

Summary of the Preferred Alternative

Implementation of management by category involving season-of-use, distribution, and adjusting livestock numbers as determined by monitoring studies over a period of time would result in a total forage production of 162,000 AUMs in the DPA by the year 2000. As range conditions improve, so should livestock production. An increase in species diversity and cool-season species would result in more palatable forage. An increase in cool-season species would provide the livestock with more protein and vitamin A particularly in the early spring when lactating livestock require a higher level of nutrition. Vegetative land treatments would further improve range conditions, forage quantity, and quality. Conducting vegetative land treatments would result in an additional 16,200 AUMs of forage allocation by the year 2000. This coupled with the AUMs produced by implementation of management by category would meet the anticipated demand of 178,200 AUMs estimated in the DPA Planning Area Analysis (BLM Socorro District Planning/EIS Files) on public land by the year 2000. The authorized use would remain the same as the grazing preference of 153,406 AUMs. The range monitoring studies would indicate true grazing capacity over the long term.

Of the total of 187 allotments in the DPA, 14 are presently under AMPs and an Experimental Stewardship Program (ESP) and would continue in this category. An additional 74 allotments would be under intensive grazing management. Twenty-three allotments with those pastures in poor range condition or occurring in wildlife habitat or with a critical watershed problem would have intensive grazing management on those pastures. These allotments would be intensively monitored. The balance of the allotments (76) would remain in a status quo situation or would not be intensively managed. These allotments would be monitored for range condition and trend.

Alternative 2 (No Action)

Under this alternative, livestock grazing management would remain as the existing situation. The existing AMPs and ESP would continue on 14 allotments and rangeland improvements funded from the range betterment fund would be given first priority to these allotments. The other 173 allotments would not be intensively managed and rangeland improvements would remain the same as present. Over the long term, as AMPs become saturated with rangeland improvements, the range betterment fund would be used to improve forage conditions for wildlife and watershed protection. The present grazing preference of 153,406 AUMs would remain unchanged over the long term. Present range conditions are improving at an estimated rate of 200 AUMs per annum. Forage allocation would increase to 145,000 AUMs by the year 2000. This would not meet the expected demand for beef production by the year 2000.

Alternative 3 (Elimination of Livestock Grazing)

Under this alternative, all livestock would be removed from the public land in the DPA. No grazing permits or licenses would be issued and all the AMPs and ESP would be cancelled. New rangeland improvements would not be constructed and existing rangeland improvements would either be removed, abandoned, or maintained for wildlife. Many livestock operators would have to liquidate or disperse their lands or obtain other grazing land to remain in the livestock business. All forage production would be available to other resource uses.

Alternative 4 (Maximization of Livestock Forage Production)

Under this alternative, all 187 allotments in the DPA would be intensively managed. This would consist of implementing season-of-use management, distribution management, and adjusting livestock numbers according to range monitoring studies through consultation, coordination, and cooperation with the livestock operators and other affected parties. Vegetative land treatments would be implemented on 545,815 acres. Forage allocation would increase to 250,000 AUMs by the year 2000. This would be 71,800 AUMs above the anticipated demand of 178,200 AUMs estimated in the DPA Planning Area Analysis. Authorized use would remain the same as the grazing preference of 153,406 AUMs. The range monitoring studies would indicate true grazing capacity over the long term. The impacts of implementing the management actions would be the same as those described in the Preferred Alternative.

CULTURAL RESOURCES

Alternatives 1, 2, and 4

BLM recognizes that some of the projects involved in implementation of the range management program could affect historic and cultural properties. Because of this fact, BLM would conduct intensive field (Class III) inventories of specific areas that would be impacted by implementing projects prior to approval. If historic or cultural properties are identified, every effort would be made to avoid adverse effects. However, where that is not possible BLM would consult with the State Historic Preservation Officer and the Advisory Council on Historic Preservation in accordance with the Programmatic Memorandum of Agreement by and between BLM and the Council, dated January 14, 1980, which sets forth a procedure for developing appropriate mitigative measures to lessen the impact of adverse effects.

Alternative 3 (Elimination of Livestock Grazing)

Alternative 3 would reduce livestock trampling on public land in the DPA by 100 percent; however, wildlife trampling would remain a factor around some water sources. Alternative 3 would destroy part of the ongoing historical development and life-style of the DPA; i.e., a long established industry would be suddenly abolished. The removal of rangeland improvements would cause some new surface soil disturbance and the loss of some potential historical structures.

VISUAL RESOURCES

Alternative 1 (Preferred Alternative)

Under the Preferred Alternative, structures and disturbances from the proposed rangeland improvements and vegetative land treatments would cause visual contrast in the landscape. Rangeland improvements would directly impact 252 acres in the short term and 66 acres in the long term. However, minor visual impact from these rangeland improvements would be expected to extend over a much greater area than these acreages. Vegetative land treatments are proposed to be conducted on 353,320 acres. These vegetative land treatments would have varying degrees of adverse visual impact in the short term; however, with the exception of pinyon-juniper control on 37,800 acres, visual enhancement over the long term would be anticipated through improved rangeland condition. Of all the proposed vegetative land treatments, only pinyon-juniper control would be expected to alter the visual character of the landscape. The degree of impact resultant from rangeland improvements and vegetative land treatments would be determined from site-specific clearances [Environmental Assessments (EAs)] before the implementation of new rangeland management systems. With the implementation of the Standard Operating Procedures described in Chapter I, visual contrasts would be expected to be minimized to a degree that would be compatible with the management objective for the Visual Resource Management (VRM) class of the area in which the contrasts would occur. No significant change in VRM classes would occur.

Alternative 2 (No Action)

The No Action Alternative contains no new components which would impact visual resources or reduce any management classes. There would be no introduction into the landscape of negative visual impacts from new grazing management systems or rangeland improvements.

Alternative 3 (Elimination of Livestock Grazing)

Under Alternative 3, no signficant impacts to visual resources would be anticipated as a result of the elimination of livestock grazing on 899,135 acres of public lands. No new rangeland improvements would be constructed and no vegetative land treatments would occur. Rangeland improvements which serve no useful purpose would be removed from public land; this would result in localized beneficial effect.

Alternative 4 (Maximization of Livestock Forage Production)

Under Alternative 4, contrasts to the existing visual resource would occur from construction of rangeland improvements and vegetative land treatments. Vegetative land treatments would visually modify 545,815 acres of public land, by varying degrees, in the short term. The contrasts created by these treatments would become less evident over time as ground cover becomes reestablished and the reinvasion of vegetative types, which existed in the area prior to treatments, occurs. The long-term improvement of rangeland condition, effected by vegetative land treatment, would enhance the overall aesthetics of the DPA with the exception of 58,238 acres of public land proposed for pinyon-juniper control. Of all the vegetative land treatments, only pinyon-juniper control would be expected to alter the visual character of the landscape. Rangeland improvements to be implemented from this alternative are unknown at this time; therefore, site-specific clearances (EAs) would be conducted to determine the degree of subsequent impact. It can be assumed, however, that short-term modification to the landscape would be greater than in the long term. These visual modifications are expected to be minimized to the degree that any contrast would be compatible with the management objective for the VRM class of the area in which it occurs.

WILDERNESS

There are 356,190 acres in eight Wilderness Study Areas (WSAs) and one instant study area under wilderness review in the DPA. These lands would be managed under BLM's Interim Management Policy and Guidelines for Lands Under Wilderness Review (1979) (BLM Socorro District Planning/EIS Files) until Congress decides to designate them as wilderness or to drop them from further wilderness review. Should all or part of these WSAs be designated as wilderness they would be managed under BLM's Wilderness Management Policy (1981).

The Interim Management Policy and Guidelines for Lands Under Wilderness Review (1979) and the Wilderness Management Policy (1981) are designed to ensure that wilderness values are not degraded by allowed grazing use or management actions to support that grazing use. For this reason there would be no significant long-term impacts from Alternatives 1, 2 or 4.

Certain allowed actions, such as prescribed burning, would result in short-term impacts to the wilderness resource. The long-term impacts, however, would have to be shown to be beneficial to wilderness values before they are authorized.

Under Alternative 3 (Elimination of Livestock Grazing), the vigor of the plant communities within WSAs would be expected to improve. This would improve the natural scenic qualities of the WSAs.

Removal of unnecessary rangeland improvements located within WSAs would reduce the amount of vehicle use on the existing access routes to such improvements. Removal of rangeland improvements and reduced use on access routes would improve the scenic and natural qualities of the WSAs.

RECREATION

Alternative 1 (Preferred Alternative)

Few recreational uses in the DPA would be affected by the Preferred Alternative. Impacts would result if fences were built without regard to recreational access needs. Livestock waters placed near existing or potential intensive use recreation areas would concentrate livestock use in these areas and increase the interaction and conflict between recreationists and livestock operators. These potential conflicts would be reduced or eliminated through mitigating measures required in site-specific EAs. Non-hunting associated recreation visitor days would be expected to increase under the Preferred Alternative and all alternatives due to a predicted increase in the human population of the region.

Deer hunting pressure would increase with any alternative due to increases in regional population. This increase would occur independent of BLM management actions. For the purpose of this analysis the changes in deer hunting visitor days would be a proportional change based on the deer population. These projections are useful in identifying future trends in visitor use. Appendix G explains the method used to project future hunting visitor days. Deer hunting visitor days would increase under the Preferred Alternative to approximately 8,550 by the year 2000. This is an increase of 4,386 visitor days from the existing level of use.

Pronghorn antelope hunting pressure would continue to be regulated by the NMDG&F. Future trends in antelope permits and hunting visitor days would be based on the antelope population.

Alternative 2 (No Action)

Under Alternative 2 demand for recreational activities would continue to increase in proportion to population growth. Deer hunting visitor days would be expected to remain near the present level of 4,164.

Alternative 3 (Elimination of Livestock Grazing)

Implementation of Alternative 3 would not significantly increase non-hunting recreational opportunities. Removal of rangeland improvements, that serve no useful purpose, and cattle would eliminate existing and potential conflicts between recreational users and livestock operators. Cross-country vehicular access would improve with the removal of fences. This improved cross-country access would be offset, however, by the reduced levels of maintenance on the existing ranch access roads. This could reduce access for all recreational activities.

Deer hunting visitor days would increase to approximately 8,550. This is an increase of 4,386 visitor days from the current level of use.

Alternative 4 (Maximization of Livestock Forage Production)

An increase in the number of rangeland improvements, vegetative land treatments, and resulting domestic livestock would increase the potential conflicts between recreational users and livestock operators. Rangeland improvements and vegetative land treatments located near existing and proposed recreation sites would further increase these potential conflicts. These potential conflicts would be greatest along the proposed route of the Continental Divide National Scenic Trail (the final trail location is unknown at this time).

It is expected that off-road vehicle (ORV) use of areas subject to vegetative land treatment would be restricted while the new vegetation responds. This would temporarily reduce overall ORV opportunities and would reduce recreational access to affected areas. Recreational access could also be restricted by the construction of new fences.

Deer hunting visitor days would increase to approximately 8,550. This represents an increase of 4,386 from the current levels of use.

SOCIAL CONDITIONS

The assessment of anticipated change by each alternative is made on the secondary social indicators which are displayed in Table III-7 and are shown by the categories of No Major Change (NMC), Possible Major Change (PMC), and Major Change (MC).

Alternative 1 (Preferred Alternative)

Social Environment

The Preferred Alternative would cause no major change in the size or general characteristics of the population of the Four-County Area nor of the livestock operating population. In the long term, the average number of increased AUMs per livestock operator would only be 235, which is not expected to require any major increase in ranch labor.

Quality of Life Conditions

In the short term, the income of the Four-County Area population and of the livestock operators would not be changed as a result of the Preferred Alternative. As management actions are implemented, there would be a continuous gradual increase until the year 2000 when the production of livestock forage would be expected to peak. The average change in income would be relatively minor; however, it would maintain the status quo or perhaps improve the quality of life by improving the accessibility to goods and services. The increase in income would also be beneficial to local businesses and commercial enterprises. These increases contribute to the quality of life. There is not expected to be a reduction in the demand for public services, such as food stamps and cash supplements since such a low percentage of the livestock operators are receiving these services now. The Preferred Alternative would ensure the continuance of ranching as a life-style and the identity of the livestock operators.

TABLE III-7

ASSESSMENT OF SOCIAL CHANGE BY ALTERNATIVES[a/]

Indicator	Alt. 1	Alt. 2	Alt. 3	Alt. 4
DEMOGRAPHY				
Pop. Size	NMC	NMC	PM	NMC
Rate of Pop. Change 1970-80 Avg. Annual %	NA	NA	NA	NA
Reason for Pop. Change (%) Births Deaths Net Migration	NA	NA	NA	NA
Pop. Size 1980- Cities, Villages	NMC	NMC	PMC	NMC
Rate of Pop. Change Avg. Annual % Change 1970-80	NA	NA	NA	NA
Pop. Projections Avg. Annual % Change 1980-90 1990-2000	NMC	NMC	PMC	NMC
Rural Pop. (%) 1970	NMC	NMC	PMC	NMC
Pop. Density-1970	NMC	NMC	PMC	NMC
Median Age-Years	NMC	NMC	NMC	NMC
Pop. 65+ - 1970 Male (%) Female (%)	NMC	NMC	NSC	NMC
% 65+ in Labor Force-1970	NMC	NMC	PMC	NMC
Sex Ratio (Male to Female)	NMC	NMC	NMC	NMC

TABLE III-7 (Continued)

ASSESSMENT OF SOCIAL CHANGE BY ALTERNATIVES[a/]

Indicator	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Race/Ethnic %				
White	NMC	NMC	NMC	NMC
White-Span. origin				
American Indian				
Other				
% Families with Children less than 18 - 1970	NMC	NMC	NMC	NMC
EDUCATION				
Median School Years Completed - 1970	NMC	NMC	PMC	NMC
Avg. Daily Membership Change (%) - 1973-74/1977-78	NMC	NMC	PMC	NMC
Pupil Drop-out Rate (% for Districts Avg.)	NMC	NMC	PMC	NMC
Pupil Mobility Rate (% for Districts Avg.)	NMC	NMC	PMC	NMC
ECONOMIC				
Civilian Unemployment Rate (%)	NMC	NMC	PMC	PMC
Total Per Capita Income - 1979	NMC	NMC	MC	MC
% Change 1978-79				
Rank in State in Terms of 1979 Per Capita Income	NA	NA	NA	NA
Median Family Income - 1969	NMC	NMC	MC	MC

TABLE III-7 (Continued)

ASSESSMENT OF SOCIAL CHANGE BY ALTERNATIVES[a/]

Indicator	Alt. 1	Alt. 2	Alt. 3	Alt. 4
PUBLIC SERVICES Pupil-Teacher Ratio (School Districts within Counties 1977-78)	NMC	NMC	NMC	PMC
Hospital Beds/1,000 Pop. 1975	NMC	NMC	NMC	NMC
Physicians/1,000 Pop. (Civilian Only 1976)	NMC	NMC	NMC	PMC
Critical Medical Shortage Area 1977	NMC	NMC	NMC	PMC
Critical Dental Shortage Area 1977	NMC	NMC	NMC	PMC
SOCIAL ORGANIZATION Resid. Stability % of Pop. 5+ not Moving for 5 yrs. 1965-70	NMC	NMC	PMC	NMC
% of Persons Less Than Poverty Level - 1969	NMC	NMC	PMC	MC
No. of Violent Crimes 1,000 Pop. 1979	NMC	NMC	PMC	NMC
Police Protection Police 1,000/Pop. 1977 (FBI Standard: 2.0)	NMC	NMC	PMC	NMC
Public Social Ser. Per Capita Amt. Financial & Food Stamps	NMC	NMC	MC	PMC

TABLE III-7 (Continued)

ASSESSMENT OF SOCIAL CHANGE BY ALTERNATIVES[a]

Indicator	Alt. 1	Alt. 2	Alt. 3	Alt. 4
% Pop. Buying Food Stamps	NMC	NMC	PMC	PMC
Avg. No. of Persons Rec. Cash Grants - Food Stamps	NMC	NMC	PMC	PMC
% Pop. Rec. Cash Grants	NMC	NMC	PMC	PMC
No. of Property Crime 1,000 Pop. 1979	NMC	NMC	PMC	PMC
Family Stability Divorces as a Percentage of Marriages-1979	NMC	NMC	PMC	PMC
Housing Pop./Housing Unit 1980	NMC	NMC	PMC	NMC

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[a] The degree of change was assessed by the following categories:

NMC - No major change
PMC - Possible major change
MC - Major change
NA - Not applicable

Sources: (Table II-9)

This alternative, which in general has support of the livestock operating community, has contributed to their personal security in knowing that through the consultation process they would share a role in making the decisions which affect them; it has lessened their anxiety of not knowing what BLM would do.

As restorative measures are taken to improve the range conditions through improved vegetation and reduction of erosion, the aesthetic values of the environment would be enhanced. The status and prestige of the livestock operating population would also be enhanced as the range conditions improve and there would be more positive perception of them as stewards of the land.

The stability of the family institution would be enhanced as there would be no forced dislocation of family members and out-migration of youth as a result of BLM actions. The community structure would not be disrupted by changes in the demographic composition, changes in the residential stability, or changes in positions of leadership and influence.

The proposed rangeland improvements and maintenance of habitat on the public land for the increase of wildlife would provide the public more opportunity for recreational experience and more opportunity for aesthetic viewing and the existence values.

Alternative 2 (No Action)

Social Environment

The No Action Alternative would cause no changes on the size or general characteristics of the population of the Four-County Area or the livestock operating population.

Quality of Life Conditions

In the long term, the income of the Four-County Area population and the livestock operators would change very little as a result of this alternative. By the year 2000 there would be an increase in AUMs of 3 percent. The life-styles and identity as ranchers would virtually remain the same as would the stability of the family institution and the community structure.

Additional rangeland improvements and maintenance of habitats on the public land for the increase of wildlife would be conducted solely in conjunction with the wildlife program. The public would have the same opportunity for recreational experience and opportunity for aesthetic viewing and the existence values as now exists.

Alternative 3 (Elimination of Livestock Grazing)

Social Environment

The elimination of livestock grazing on the public lands would create some significant changes in the size and composition of the ranching population of the Four-County Area. Using a worst-case analysis, it is estimated that 62 percent of the livestock operators would have to cease their operations. This would mean that many livestock operators and ranch laborers and their respective family members would be forced to move from their present abodes. It is expected that this movement would be dispersed throughout the Area with a large number moving from the rural to urban areas in search of jobs. Should this total number move to Magdalena or to the Grants/Milan area there would be additional demands on an already strained infrastructure. Many of the livestock operators 65 years and older would probably have to enter the workforce.

Quality of Life Conditions

The income of the population of the Four-County Area and of 67 percent of the livestock operators would be changed by a major decrease with the elimination of livestock grazing. The livestock operators would lose the Federal preference of 153,406 AUMs immediately after this decision was made. This would decrease the quality of life of 156 livestock operators by a reduction in their accessibility to goods and services. It is expected that 52 percent of the livestock operators would be less affected by this alternative, as they do not live on and operate the ranch; therefore, the decrease would be in supplemental income rather than in subsistence income. Each of the four Counties is already below the State average in per capita personal income, with the lowest rate in Catron County. The median family income is also lower than the State, especially Catron and Socorro Counties. This decrease in income is expected to affect the business operations of the villages and towns as the ranchers have less income to spend. For the livestock operators it would mean that many would have to take a part-time, or even a full-time job off the ranch. This would be compounded by the above State average unemployment rate especially for Catron and to a lesser extent for Valencia/Cibola Counties. The age of some of the livestock operators and their inexperience in the off-the-ranch labor market would be a barrier to employment. Some of the young adults may be forced to drop out of school to enter the workforce in order to supplement the family income. The drop-out rate in Socorro County is considerably higher now than the State average. The average daily membership of the schools would be changed as there would be more pupil drop-outs, more student mobility and more demand on the urban school systems as rural-urban migration occurs.

The amount of police protection now provided for the Area equals or exceeds that of the State; however, if rural to urban migration occurs, additional police would be needed. The number of violent crimes would not be expected to increase to exceed the State average; however, as anxiety arises with decreases in income and the uncertainty of the future, the possibility is increased. The number of property crimes would be expected to increase because of the aforementioned reasons; however, it would not be expected to exceed the State rate.

There would be an increase in the demand for public social services especially for food stamps and cash grants as the number of persons below the poverty level would be expected to increase. The residential stability of the community would be altered as livestock operators and their families who have lived in the same area all their lives are forced to move off the ranch. Stability of the family would be affected as the anxiety and uncertainty would contribute to divorce rates of which Socorro is already above the State average while Valencia/Cibola Counties equal the State rate.

The patterns of social interaction of the communities of the DPA would be seriously disrupted as a result of people moving away and as many of the social gathering places of the community would be forced to close.

Alternative 4 (Maximization of Livestock Forage Production)

Social Conditions

This alternative would cause no major change in the size or general characteristics of the population of the Four-County Area. In the long term the average number of increased AUMs per livestock operator would be 695. It is estimated that additional people would be needed in the ranching community to handle the increase in cattle but this number of people would not be expected to produce major change in the ranching populations. These additional jobs might be filled with the youth who previously have had to migrate to the urban areas for work.

Quality of Life Conditions

The income of the population of the Four-County Area and that of the livestock operators would be changed in a major way in the long term by an increase in AUMs of 77 percent. This would improve the quality of life by having much more accessibility to goods and services. The increase in income would also be beneficial to local businesses and commercial enterprises. There would be a reduction in the demand for public services such as food stamps and cash supplements.

This alternative would ensure continuance of the ranching life-styles and the identity as livestock operators. The residential stability and the patterns of social interaction would continue.

The quality of life of the livestock operators and the people of the DPA would be enhanced by a reduction of the unemployment rate, an increase in the per capita personal income, and an increase in the median income. The number of property crimes would be reduced as people receive increased income and have more personal security. Family stability would be increased. Some change would occur in the public services; as more income is produced, the quality of medical services would improve.

ECONOMIC CONDITIONS

Impacts of Proposed Grazing Use on Typical Ranch Operations

Economic impacts on the typical livestock operation would result from changes in permitted BLM grazing use; i.e., changes in AUMs. The proposed alternatives, with the exception of the Elimination of Livestock Grazing Alternative (Alternative 3), would result in an increase in livestock forage production with potential direct and indirect beneficial impacts on the DPA ranch operators. (Alternative 3 would increase forage production but would have adverse economic impacts on the DPA livestock operators.) A BLM-livestock operator consultation period is proposed in which livestock adjustments would be possible for each alternative. This action could possibly affect ranch operations by increasing costs and reducing both rancher incomes and equities.

Basis For Impact Analysis

This analysis considers possible beneficial and adverse direct and indirect impacts of the preferred alternative (both short and long term) versus the livestock operators' active preference AUMs, licensed livestock use and rancher-initiated non-use over a 14-year average licensed use. Changes were measured between the Preferred Alternative and the 14-year average licensed use as the 14-year average approximates actual use of BLM forage. The representative ranch budgets used for this analysis reflect the 1980 business year for the rancher, and measurement of ranch economic effects should reflect impacts due to the alternative as compared to actual use. Present use has been identified for each livestock operator in four ranch size categories as follows:

Subsistence: 81 operators, average size 27 AUs
Small: 39 operators, average size 124 AUs
Medium: 25 operators, average size 295 AUs
Large: 11 operators, average size 1,171 AUs

Economic Condition

To determine the economic change resulting from implementing an alternative, it was necessary to establish boundaries for the study area. Basically, the study area includes all of Catron and Cibola Counties, the City of Socorro, and the Village of Magdalena (both in Socorro County). It was necessary to include portions of Socorro County because the DPA is an isolated rural area which includes few villages with few inhabitants. It is evident that most DPA livestock operators with grazing permits purchase goods and services outside the study area in locations such as Albuquerque, New Mexico; and Springerville, Arizona.

An input/output economic model was used to simulate incremental production patterns in the DPA. The model is designed to represent the New Mexico economy with emphasis placed on the DPA. Inputs for this model were derived from representative ranch budgets developed from interviews with livestock operators.

Alternative 1 (Preferred Alternative)

Economic Condition (Beneficial)

The Preferred Alternative would neither change the size nor the general characteristic of the total population, nor would it cause any measurable shifts in employment patterns and, therefore, would not have significant effect on in- or out-migration of people, the infrastructure, the unemployment rates, or State financial assistance; i.e., food stamps. The livestock operators, using public lands for grazing, and their families who would be directly affected by a BLM action constitute a small percentage of the population of the DPA. However, any action by BLM on their grazing use would have a direct economic impact.

Under the Preferred Alternative there would be an increase in forage production in the short term with an even greater increase in the long term. Assuming that all livestock operators would be authorized to increase their stocking rate by 10 percent in the short term and 20 percent in the long term (commensurate with livestock forage production), an increase in livestock sales of approximately $150 thousand (1.7 percent) and $299 thousand (3.5 percent) would occur in the short and long terms, respectively. With a 10-percent increase in permitted livestock grazing, sales for the subsistance operator would increase by $288, $977 for the small operator, $1,901 for the medium operators and $3,630 for the large operators. With a 20-percent increase in livestock grazing sales, the subsistance operators' income would increase by $576, $1,995 for the small operators, $3,783 for the medium operators and $7,262 for the large operators. If a 30-percent increase in forage production was achieved, either in the short or long terms, gross livestock sales would increase by $447 thousand or 5.2 percent. A 30-percent increase in permitted livestock grazing would increase livestock sales for the subsistance operators by $847, $2,993 for the small operators, $5,648 for the medium operators and $10,892 for the large operators. (Table III-8 for cumulative estimated costs and return for all ranch operations and Tables H-13 thru H-15 for estimated cost and returns for individual ranch size categories). The subsistance and small commercial ranch operators would continue to operate at a loss with the 10, 20, and 30 percent increase in permitted livestock grazing.

It is assumed that under the Preferred Alternative most of the people who make up the labor force in the ranching community would continue to work with extended work hours, as a result of an increase in herd sizes, and live at their present location. (See Tables H-2, H-5, H-8 and H-11 for increased work hours.)

The Preferred Alternative would not result in a significant change in employment for the DPA. Four jobs would be gained with a 10-percent increase in livestock sales: two in range livestock, one in motor freight transportation, and one in retail. With a 20-percent increase in livestock sales, eight jobs would be gained: four in range livestock, one in other agriculture, one in motor freight transportation, one in other transportation, and one in retail. With a 30-percent increase in livestock sales 13 jobs would be gained: five in range livestock, one in other agriculture, one in motor freight transportation, one in other transportation, one in wholesale, one in retail, one in finance insurance and retail, one in personal service and one in auto repair.

TABLE III-8

ESTIMATED COSTS AND RETURNS FOR REPRESENTATIVE RANCH OPERATIONS IN THE DPA WITH INCREMENTAL PERCENTAGE INCREASES IN LIVESTOCK ADJUSTMENTS*

Budget Items	Existing	+10 Percent	+20 Percent	+30 Percent
Livestock Sales	$8,637,870	$8,787,536	$8,936,788	$9,085,116
Cash Costs	3,373,272	3,431,664	3,479,963	3,528,021
Net Cash Income	$5,264,598	$5,355,872	$5,456,825	$5,557,095
Depreciation	1,007,274	1,012,607	1,017,915	1,023,156
Net Income	$4,257,324	$4,343,265	$4,438,910	$4,533,939
Other Costs**	3,561,918	3,615,844	3,669,528	$3,722,697
Return Net Income to Land	$ 695,406	$ 727,421	$ 769,382	$ 811,242

* See Appendix H, Tables H-13, H-14 and H-15 for estimated costs and returns for individual ranch size categories.

** Other costs include family labor and interest in investments other than land.

Source: BLM Socorro District Planning/EIS Files

The relatively small increase in projected income to livestock operators, would result in an insignificant change in personal income to workers in livestock related industries. An indirect increase in personal income of approximately $27 thousand is estimated with a 10-percent increase in permitted livestock grazing, $56 thousand with a 20-percent increase and $83 thousand with a 30-percent increase.

Positive impacts to the financial position of the livestock operator would result in the Preferred Alternative. Ranches are valued by financial institutions, in part, on the number of AUMs they possess or control. With an increase in livestock grazing capacity in the short and long terms, the valuation of ranches for bank purposes would escalate by approximately 10.9 percent and 25.9 percent, respectively. This would result in an increase of approximately $16 and $40 million, respectively, in ranch values and a corresponding increase in the financial flexibility of livestock operators.

BLM would expend $7,148,400, implementing the Preferred Alternative in the long term, for rangeland improvements and vegetative land treatments. This regional expenditure would gain 228 jobs and increase personal income in related industries by approximately $4 million. One hundred thirty-seven (60 percent) of these jobs would be in construction. The other 91 jobs (39 percent) would be in construction related industries. Income and jobs gained by this action is in addition to an increase in the range livestock industry (See Appendix E, Table E-1, for proposed livestock rangeland improvements).

It should be noted that the ranching industry would continue to play an important role in the DPA economy. Any action by BLM in range livestock adjustments, would have a direct impact on the livestock operators and their families who depend on public lands for grazing. These operators are approximately 64.5 percent dependent on public lands for grazing.

Economic Condition (Adverse)

If, on the other hand, during the consultation process it is demonstrated that adjustments would be needed to improve range conditions, primary and secondary effects would result for the short and long terms. The results would be a decrease in livestock sales, personal income, and a decrease in the financial position of the rancher. It would also decrease income and employment opportunities in the DPA.

Adjustments (-10 percent, -20 percent, and -30 percent) resulting from implementing management actions would reduce direct income from ranching by $152 thousand, $299 thousand and $448 thousand respectively, but would not force termination of any of the livestock operations in the short term. This action would probably force some operators to leave the industry in the long term. With a 10-percent reduction in permitted livestock grazing, livestock sales for the subsistance size operators would be reduced by $287, $998 for the small size operators, $1,996 for the medium size operators and $3,670 for the large size operators. With a 20-percent decrease livestock sales would drop by $575 for the subsistance operators, $1,996 for the small operator, $3,782 for the medium operators and by $7,301 for the large operators. A 30-percent reduction would drop livestock sales by $846 for the subsistance operators, $2,994 for the small operators, $5,683 for the medium operators and $10,932 for the large operators. The subsistance operators and small operators would continue to operate at a loss with a 10-, 20-, and 30-percent reduction in permitted livestock grazing. At a 30-percent reduction the medium size operators would start operating at a loss. (See Table III-9 for cumulative costs and returns for all ranch operators and Tables H-16 thru H-18 for costs and returns for individual ranch size operations.) Livestock operators, their families and hired labor would have to obtain off-ranch employment to supplement reduced ranch income.

TABLE III-9

ESTIMATED COSTS AND RETURNS FOR ALL RANCH OPERATIONS WITH INCREMENTAL DECREASES IN LIVESTOCK ADJUSTMENT FOR THE DIVIDE PLANNING AREA

Budget Items	Existing	-10 Percent	-20 Percent	-30 Percent	-40 Percent	-50 Percent	-100 Percent
Livestock Sales	$8,637,870	$8,485,431	$8,338,590	$8,190,251	$8,040,535	$7,891,364	$7,144,569
Cash Costs	3,373,272	3,318,422	3,271,036	3,223,049	3,174,696	3,126,529	2,885,578
Net Cash Income	$5,264,598	$5,167,009	$5,067,554	$4,967,202	$4,865,839	$4,764,835	$4,258,991
Depreciation	1,007,274	1,001,910	996,752	991,500	986,203	980,895	954,567
Net Income	$4,257,324	$4,165,099	$4,070,802	$3,975,702	$3,879,636	$3,783,940	$3,304,424
*Other Costs	3,561,918	3,507,334	3,454,517	3,401,356	3,347,469	3,293,838	3,025,363
Return Net Income to Land	$ 695,406	$ 657,765	$ 616,285	$ 574,346	$ 532,167	$ 490,102	$ 279,061

Note: For individual estimated costs and returns for ranch size categories see Appendix H, Tables H-16 - 21.

* Other costs include family labor and interest in investments other than land.

Source: BLM Socorro District Planning/EIS Files

If livestock adjustments were necessary, in the Preferred Alternative and in authorized levels of grazing use, a temporary increase in livestock sales and increased income would occur as herds would be diminished and livestock sold. However, livestock operators would maintain their operations on State or private lands or even consider supplemental feeding. Maximum increase in livestock sales would not last longer than one or two years.

The Preferred Alternative would result in a reduction in DPA employment for each incremental reduction in livestock grazing. Three jobs would be lost with a 10-percent adjustment: two in range livestock, and one in agricultural service. With a 20-percent adjustment, seven jobs would be lost: four in range livestock, one in agricultural service, one in communication, and one in lodging places. With a 30-percent adjustment nine jobs would be lost: five in range livestock, one in other agriculture, one in agricultural services, one in communication and one in lodging places. Neither of these reductions would change the structure of the DPA economy. However, the small general stores in the DPA would possibly have a reduction in sales.

A relatively small change in livestock sales would not result in a significant change in personal income for individuals within the DPA; a reduction of $28 thousand (in direct income) is estimated with a 10-percent decrease in livestock sales, $56 thousand with a 20 percent decrease and $83 thousand with a 30-percent decrease.

Short- and long-term adjustments in BLM AUMs would result in an impact on livestock operators' earning capacity and ultimate acquisition and use of capital. The major financial problems facing most livestock operators pertain to using funds within the ranching business and to obtaining necessary financing. An example of the process and effects that a downward adjustment of AUMs may have on borrowers or potential borrowers through the Federal Land Bank Association is described as follows: Livestock operators obtain loans through the Federal Land Bank Association for long-term credit and rely on Production Credit Associations or Commercial Banks for obtaining short-term credit.

Federal law limits the size of real estate loans to 85 percent of the normal agricultural value as specified in the appraisal report, in this case AUs. An AU, in the San Augustine Resource Area, sells for $1,100 (Federal Land Bank Association 1982). Ranches are appraised on the number of AUs, or "cows yearlong." Appraisals are based primarily on projected ranch income and closely tied to authorized livestock or (AUMs) use.

Reductions in BLM authorized use in the short term would result in immediate impacts on livestock operators' ability to borrow recurring short-term capital because of reduced income. With high interest rates, reduction in income, and constraints on the agricultural financial institutions, the livestock operators' ability to borrow both short- and long-term capital may be significantly impacted, especially if they attempt to sell or expand, through purchase of additional land, livestock, etc. In the long term, livestock operators in the DPA would probably continue to stay in the ranching business for a variety of reasons, including ignoring the "opportunity costs" of labor and owned capital and confining their concerns to covering operating and debt service cash costs.

A 10-percent adjustment would result in a decrease of approximately $16 million in ranch value and a corresponding decrease in the financial flexibility of livestock operators. This decrease affects the livestock operators only if they are willing to sell their ranches.

If a reduction in permitted livestock grazing were possible, the BLM would still expend the $7,148,000 for rangeland improvements and vegetative land treatment in implementing Alternative 1. Jobs that would be lost with livestock adjustments would be substituted by construction workers and other related industries.

The ranching industry would continue to play an important role in the DPA. Any action by BLM on permitted levels of grazing would have a direct impact on the livestock operators and their families.

Alternative 2 (No Action)

Economic Condition

The No Action Alternative would not result in beneficial or adverse changes in the general structure of the DPA economy. Established economic trends between 1970 and 1982 would persist. Any changes that would occur would not be due to factors related to the No Action Alternative.

The No Action Alternative would be a continuation of the current BLM Socorro District range management program. Authorized livestock numbers would remain constant and livestock numbers on allotments would be adjusted up or down if monitoring studies indicated a change in livestock grazing capacity.

Under the No Action Alternative the BLM Socorro District in the long term would expend approximately $3.2 million for rangeland improvements. This action, would result in an additional 65 jobs and an approximately $3.1 million-increase in personal income for the DPA economy. Twenty five percent (16) of the new jobs would be in the construction industry. The other 75 percent (49 jobs) would be in construction related industries (See Appendix E for proposed rangeland improvements).

Alternative 3 (Elimination of Livestock Grazing)

Economic Condition

The Elimination of Livestock Grazing Alternative would result in no significant changes on the size or composition of the population and structure of the DPA economy. Small general stores in communities such as Datil and Quemado, New Mexico, which depend somewhat on income derived from ranching would be affected. Significant, primary impacts would be on those livestock operators depending on public lands for grazing.

In Alternative 3 a reduction in permitted livestock grazing would reduce income from livestock sales by $1.4 million in the long term. A temporary increase in livestock sales and income would occur as herds would be diminished and livestock sold. Maximum increases in livestock sales would not last longer than two years.

A 100-percent reduction in permitted levels of grazing would reduce in the long term the gross income of subsistance operators by $2,844, $9,981 for the small operators, $19,034 for the medium operators and by $36,348 for the large operators. The large operator would not be operating at a loss under this alternative. However, all ranch size categories would continue to meet all cash costs and operators would continue to live off their depreciation. (See Table H-21 for individual estimated costs and returns for representative ranch operators.)

Alternative 3 would force livestock operators to sell, supplemental feed, or graze approximately 64.5 percent of the total AUMs dependent on public lands for grazing on private or State lands. Some livestock operators, due to reduced income, would leave the livestock industry and seek non-ranch jobs and other sources of income. Some of the livestock operators and their families might relocate to find suitable employment. Most ranchers would continue ranching under Alternative 3. Their continued operation would depend upon their prior level of dependency on public land for grazing and their ability to meet all cash costs after individual adjustments in levels of grazing.

Alternative 3 would reduce employment in the DPA economy by 34 jobs: 14 (41 percent) would be in the range livestock industry; the other 20 (58 percent) would be in range related industries. The Elimination of Livestock Grazing Alternative would not affect the general structure of the DPA economy.

The elimination of $1.4 million in ranch income would be relatively small (1.1 percent) compared to the total dollar amount of personal income in the region, which is approximately $125 million. However, ranching would continue to play an important part in the lives of those directly affected by the Elimination of Livestock Grazing Alternative.

The Elimination of Livestock Grazing Alternative would have a dramatic impact on ranch valuations. The elimination of 153,406 AUMs would result in a decrease of $168.7 million in ranch values and a corresponding decrease in the financial flexibility of ranch operators.

In the Elimination of Livestock Grazing Alternative, the Federal Government would expend approximately $660,000 through the short term. In addition, an estimated 2,554 miles of fence would have to be constructed by the private landowner or State land lessee. This action would have positive impact in the DPA. Personal income would increase by $3.8 million and would gain 232 jobs in the short term. One hundred forty-three jobs (62 percent) would be in the construction industry and the other 89 jobs (38 percent) would be in related construction industries.

Alternative 4 (Maximization of Livestock Forage Production)

Economic Condition

Alternative 4 would have no significant impact on the general characterization of the population or the economic structure of the DPA. The livestock operators, their families, and the hired laborers who would be directly affected by this alternative constitute a small percentage of the population.

The Maximization of Livestock Forage Production Alternative indicates that there would be approximately a 30-percent increase of forage production in the short term with an even greater increase, 76 percent in the long term.

With a 30-percent increase in permitted livestock grazing, the subsistance operator would increase their income from livestock sales by $847, $2,993 for the small operators, $5,648 for the medium operators and $10,892 for the large operators. A 76-percent increase would raise income for the subsistance operator's by $930, the small operator's by $4,598, the medium operator's by $11,119 and the large operators by $54,365.

Assuming an increase, 30 and 76 percent in the short and long terms, respectively, in the authorized stocking rates for all ranch categories, and an increase in livestock sales of approximately $447 thousand and $1.1 million would occur in the short and long terms, respectively.

To the DPA economy, the short term would increase income by $83.4 thousand and make 13 additional jobs available. Five jobs (38 percent) would be gained in the range livestock sector and the other 8 jobs (61 percent) would be gained in range related industries. The long term would increase income by $241 thousand and add 23 jobs. Fourteen jobs (60 percent) would be gained in the range livestock sector and the other 9 jobs (39 percent) would be gained in range related industries.

A significant increase in domestic livestock herd sizes would also result from Alternative 4. Overall herd sizes would vary by ranch size categories (See Alternative 1).

The short- and long-term impacts on the financial positions of the livestock operators would be beneficial. With average herd sizes increasing in all ranch categories, livestock operators would tend to increase borrowing in the short and long terms; also the valuation of ranches for bank purposes would be increased by approximately 31.6 and 76.5 percent, respectively. This would result in an increase of approximately $48.8 million in the short term and $119.2 million in the long term in ranch values and a corresponding increase in the financial flexibility of ranch operators.

For the Maximization of Livestock Forage Production Alternative, the BLM Socorro District would expend $7.4 million in vegetative land treatments in the long term. This would indirectly increase the income of the DPA by $4.4 million and result in an increase of 240 jobs. In the construction sector 151 jobs (62 percent) would be gained. The other 89 jobs (37 percent) would be gained in construction related industries.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

This section identifies the irreversible and irretrievable commitments of resources resulting from the alternatives under consideration. The term "irreversible" refers to what is incapable of being reversed; once something is initiated, it would continue. The term "irretrievable" means irrecoverable; once something is used, it is not replaceable.

Under Alternatives 1 and 3, an irreversible loss of vegetation would occur on 66 and 511 acres, respectively, where permanent rangeland improvements would be constructed. Irreversible loss of vegetation would also occur from Alternatives 2 and 4; however, since the number, type, and location of rangeland improvements inherent to these Alternatives are unknown at this time, the irreversible loss of vegetation is unquantifiable. Also, under Alternatives 1, 2, and 4 the loss of soil through increased wind and water erosion as a result of vegetative land treatments would be irreversible.

There would be an irreversible and irretrievable loss of potential knowledge from future advances in archaeological techniques as a result of the construction of rangeland improvements and vegetative land treatments in all alternatives except Alternative 3. However, this would be partially mitigated by site-specific resource inventories, recordation, or excavation prior to constructions or treatments. Cultural resources are nonrenewable and once salvaged or destroyed cannot be replaced; when the decision is made to salvage a cultural resource rather than avoid it, an irreversible and irretrievable commitment of the resource is made. Irreversible and irretrievable losses from erosion, unauthorized collection, and vandalism would continue to occur under all alternatives, although the majority of these losses would not be attributable to any of the alternatives under consideration.

There would be an irreversible and irretrievable loss from construction of rangeland improvements, vegetative land treatments, and operation of improvements which would require the expenditure of fossil fuel. This loss would be partially mitigated by using wind and solar power whenever possible.

Implementation of Alternative 3 would result in livestock production within the DPA abolished, diminished net cash incomes to livestock operators and their families, and the subsequent necessary abandonment of ranching life-styles and settings. These all represent irreversible and irretrievable commitments.

Implementation of Alternative 1 would result in the expenditure of approximately $7 million (1982 costs) of Federal Government funds, through the long term, for implementing management actions by category on all 187 allotments, conducting rangeland improvements and vegetative land treatments, and conducting range management and wildlife habitat monitoring studies. Implementation of Alternative 2 would result in the expenditure of approximately $3.2 million (1982 costs) of Federal Government funds, through the long term, for continuation of the current BLM Socorro District range management program, excluding range improvements and vegetative land treatments. Implementation of Alternative 3 would result in the expenditure of approximately $660,000 (1982 costs) of Federal Government funds, through the short term, for trespass detection, and trespass case processing. Implementation of Alternative 4 would result in the expenditure of approximately $7.4 million (1982 costs) of Federal Government funds, through the long term, for developing AMPs on 173 allotments, conducting vegetative land treatments on 545,815 acres of public land, and conducting range management and wildlife habitat monitoring studies; cost expenditures do not include rangeland improvements because number, type and locations of these projects are currently unknown. The expenditure of Federal Government funds represents both an irreversible and irretrievable commitment of resources.

CHAPTER IV

CONSULTATION AND COORDINATION

INTRODUCTION

This Chapter presents the consultation, coordination, and public involvement which was conducted during preparation of Bureau of Land Management (BLM) planning documents for the Divide Planning Area (DPA), the Preferred Alternative and the other three alternatives under consideration and the West Socorro Rangeland Management Program Draft Environmental Impact Statement (EIS). A list of persons involved in the preparation of this EIS is provided in the Team Organization section.

The Federal Land Policy and Management Act (90 Stat. 2743; 43 U.S.C. 1701-1771) requires, in part, the Secretary of the Interior to prepare and maintain land-use plans on public lands administered by BLM. BLM requires (BLM Manual 1601 - Planning System) that, during the preparation of these land-use planning documents, public participation plans be developed and public input and opinion utilized in the decision making process. A public participation plan was developed for the DPA and this plan is available for public review in the BLM Socorro District Planning/EIS files.

During the development of the DPA planning documents described in Chapter I and Appendix E, the BLM Planning System was presented to the public at meetings, in news releases, and in various publications. Also, many individual contacts were made via telephone, letters, and informal meetings. At the same time, the public was given the opportunity to contribute their knowledge, ideas and proposals regarding the many resources and resource uses in the DPA.

Council on Environmental Quality (CEQ) regulations for implementing the National Environmental Policy Act (NEPA) require "an early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action." To ensure implementation of these Regulations, the BLM Socorro District Office has continued coordination with various Federal, State, local agencies, and interested persons to gather information and identify issues pertaining to the DPA.

The following listing is representative, but not all-inclusive, of the contacts made during the development of the DPA multiple land-use plan, the Preferred Alternative and other alternatives under consideration, and the EIS scoping process (BLM Socorro District Planning/EIS Files).

August 22, 1978 - The public was invited to attend an informational meeting to discuss development of the forthcoming multiple land-use plan for the DPA.

Fall 1978-79 - The BLM Socorro District range survey was initiated. Livestock operators were contacted to explain what the vegetative survey typing crew was doing. Livestock operators were invited to accompany the crew while they conducted study transects.

October 4, 1979; October 24, 1979 and April 2, 1980 - Letters were sent to all DPA livestock operators to solicit their comprehensive allotment needs.

December 19, 1979 - Letters were sent to all County Commissioners and City Managers within the DPA informing them that BLM was conducting an inventory of existing public purpose areas and assessing the need for public land as future public purpose sites.

January 29, 1980 - Letters were sent to all DPA livestock operators to request information regarding the May Beetle infestation and the extent of damage it had caused.

February 1980 - Letters were sent to an extensive list of public land users inquiring about the amount and kind of recreational activity they conduct in the DPA. Responses indicated rather minor recreational use of the DPA. Issues were raised, however, regarding visitor use including vehicles destroying fences, lack of BLM signs, small and limited numbers of woodcutting areas, and lack of campgrounds.

March 25, 1980 - BLM representatives attended a County Commissioners' meeting in Grants, New Mexico to explain the BLM planning process and solicit comment regarding the DPA plan.

April 1, 1980 - BLM representatives attended a County Commissioners' meeting in Reserve, New Mexico to explain the BLM planning process and solicit comment regarding the DPA plan.

May 1980 - Letters were sent to various utility companies requesting information regarding their power and pipeline routes and the need for public land as future utility corridors.

September 5, 1980 - A synopsis of the BLM Planning System was presented to the Socorro District Multiple-Use Advisory Council, along with copies of the Unit Resource Analysis (URA) and the Management Framework Plan (MFP) Step 1. Comments regarding these planning documents were solicited.

October 14, 1980 - A BLM representative met with the Tularosa Basin Rock Hounds to discuss the DPA URA and MFP and the Stallion-Ladron off-road vehicle (ORV) designations. The group indicated opposition to ORV closures but were in favor of restricted areas.

January 12, 1981 - A letter was sent to all of the County Commissioners, the Councils of Government (COG), the Resource Conservation and Development (RC&D) Area Councils, and the Soil and Water Conservation Districts (SWCD) within the DPA informing them of the status of the DPA planning effort and to solicit comment.

February 26, 1981 - A meeting was held with the Southwest New Mexico RC&D Area Council to explain the BLM Planning System, the status of the Divide MFP, Step 1, and to solicit comment. Representatives of the Southwest New Mexico COG and the Jornada RC&D Area Council were also present.

March 9, 1981 - A meeting was held with the Middle Rio Grande COG to explain the BLM Planning System, the status of the Divide MFP, Step 1, and to solicit comment.

March 9, 1981 and May 5, 1981 - A meeting was held with the HUB RC&D Area Council to explain the BLM Planning System, the status of the Divide MFP, Step 1, and to solicit comment.

Meetings were held in Socorro on March 30, 1981; Albuquerque on March 31, 1981; Grants on April 2, 1981; Datil on April 7, 1981; Quemado on April 7, 1981; and in Springerville, Arizona on April 24, 1981; to discuss development of the DPA MFP and to solicit comment.

April 1981 - A brochure which described the objectives formulated for multiple-use land management within the MFP for the DPA was disseminated to all County Commissioners, COGs, RC&D Area Councils, SWCDs within the DPA, the BLM Socorro District Grazing Advisory Board, and the BLM Socorro District Multiple-Use Advisory Council. Comments were solicited regarding the objectives.

May 8, 1981 - A meeting was held with the Middle Rio Grande COG to explain the BLM Planning System, the status of the Divide MFP, Step 1, and to solicit comment.

May 13, 1981 - A BLM representative met with the Southern Rio Grande COG to explain the above mentioned Divide MFP Brochure and to solicit comment.

May 13, 1981 - A BLM representative met with the Jornada RC&D Area Council to explain the DPA MFP Brochure and to solicit comment.

May 14, 1981 - A BLM representative met with the Southwest New Mexico COG to explain the DPA MFP Brochure and to solicit comment.

June 2, 1981 - Several BLM representatives met with the HUB RC&D Area Council to discuss the DPA MFP Brochure and to solicit comment. The Council, in a letter dated July 10, 1981, requested that the DPA plan provide methods to reduce soil erosion to protect forest resources and to prevent abuse of public lands. The Council supports efforts to make public land contiguous throughout the DPA through various means and then to preserve public land in as natural a state as possible. The Council however, also requested that the plan provide for all multiple-use purposes, including livestock grazing.

June 4, 1981 - BLM representatives presented a synopsis of the BLM planning process for the DPA and solicited input on the MFP Brochure from the Board of Directors, Middle Rio Grande COG.

During the spring of 1978 through 1981, numerous individual contacts were also made with representatives of various interests to obtain information regarding resources and resource uses of the DPA. These contacts were documented on BLM Form 1600-16, "Record of Public Participation in the Planning Process," and are available for review in the BLM Socorro District Planning/EIS files.

During the formulation of the Range Management URA and MFP 1 (Preferred Alternative), BLM specialists requested input from the Socorro District Grazing Advisory Board, Range Improvement Task Force, Socorro District

Multiple-Use Advisory Council, Southwest Region of the Sierra Club, New Mexico State Land Office, New Mexico State Department of Agriculture, all livestock operators within the DPA, and many individuals.

April 24, 1981 and July 20, 1981 - The Socorro District Grazing Advisory Board met and members expressed that they were in favor of flexibility regarding the salt and/or supplement recommendation included in the Preferred Alternative. The Board also felt that rest periods should not be too restrictive and wanted to add the construction of range improvements to allotments in Management Category F. They also wanted to add the words "common sense" to the proposed method of implementation. The Board also felt that the method for determining livestock grazing capacity should not be limited to the 13- to 14-year average past licensed use.

April 24, 1981 - The Range Improvement Task Force informally expressed that they favored flexibility regarding the salt and/or supplement recommendation and rest periods.

August 26, 1981 - A meeting was held in Datil, New Mexico at the request of the Socorro District Grazing Advisory Board and the West Central Grazing Permittees Association so BLM could explain the Preferred Alternative and other alternatives under consideration to the DPA livestock operators. There were approximately 30 livestock operators present and one representative from the New Mexico Department of Agriculture. The livestock operators expressed that they were displeased with problems encountered with implementing the East Socorro Grazing EIS. They expressed interest in the Preferred Alternative and asked for clarification. In general, they felt the new proposal was an improvement over past operating procedures.

The formal scoping process began in late Spring of 1981 and included meetings, a Federal Register notice, and news releases. These are listed below along with the major issues and concerns that were discussed during the formal scoping meetings.

August 23-24, 1981 - News releases were issued to various New Mexico newspapers; e.g., Albuquerque Journal, Socorro Defensor Chieftain, etc., and several other media which announced the preparation of the EIS on the DPA.

August 27, 1981 - A notice was published in the Federal Register (Vol. 46, No. 166, p. 43316) announcing preparation of the West Socorro Rangeland Management Program EIS.

September 8, 1981 - A notice was sent to the public (see Public Review of the EIS) explaining the EIS alternatives under consideration and inviting them to public scoping meetings, scheduled in Magdalena, Grants, Quemado, and Albuquerque, New Mexico. Comments regarding development of the EIS were also requested.

September 8, 1981 - Announcements regarding the scoping meetings were sent to all newspapers and other media within the DPA.

September 21, 1981 - A meeting was held at the Magdalena City Hall. Five members of the public attended this scoping meeting. Those in attendance were in agreement with the Preferred Alternative. One person stated, "It was better than the approach used 2 years ago." The major concern raised was the involvement of livestock operators in the consultation process.

September 23, 1981 - A meeting was held in Grants, New Mexico. Eight people were in attendance. General concerns included: Conducting range studies over a period of years, restricting livestock grazing due to wilderness designation in El Malpais, and spraying of problem forbs. It was the consensus of the attendees that the Preferred Alternative for the EIS was basically good. In addition, livestock operators wanted to be consulted with but not dictated to, and they wanted BLM/livestock operator cooperation in establishing a working relationship.

September 24, 1981 - A meeting was held in Quemado, New Mexico. Six people were present. The primary issue raised was that should an allotment be identified as needing an adjustment in livestock numbers, it would be difficult to find a level for agreement. The public felt the livestock operator would probably want to use the highest figure while BLM would probably want to use the lowest. Another issue of concern was the method of disposal for certain isolated tracts of land located in El Malpais. Livestock operators wanted first priority should the land be offered for exchange or sale. It was the general consensus that the Preferred Alternative was far superior to any other BLM District EIS proposal.

October 7, 1981 - A meeting was held in Albuquerque, New Mexico. Two members of the public attended. Both individuals reacted favorably to the Preferred Alternative. They liked the provisions for individual allotment variation and flexibility, and for assessing allotments from the worst to the best condition order; they felt it was a practical approach. They also approved of BLM considering economic impacts and trend.

OTHER ALTERNATIVES CONSIDERED

No additional alternatives were identified and no alternatives have been dropped from consideration during the planning or scoping processes for this EIS.

PUBLIC REVIEW OF THE DRAFT ENVIRONMENTAL IMPACT STATEMENT

The Draft EIS will be sent to and comments requested from the following computerized list of agencies, interest groups, and individuals.

WEST SOCORRO RANGELAND MANAGEMENT PROGRAM EIS MAILING LIST

GRAZING ADVISORY BOARD		MR J B KELLY
		MR OLIVER M LEE
		MR PHIL HARVEY
		MR ROBERT L MORRISS
		MR WILL ORNDORFF
MULTI USE ADVISORY COUNCIL		DR CARL J POPP
		DR CLAY T SMITH
		DR V W HOWARD JR
		MR CLAUDE WALLACE
		MR FRANK TENORIO
		MR OLIVER M LEE
		MR ROBERT L DUSENBURY
		MRS KATHLEEN LEFEBRE
		STATE REP JAMES L MARTIN
MEDIA NEWSPAPERS	ALBUQUERQUE JOURNAL	EDITOR
	ALBUQUERQUE NEWS	
	ALBUQUERQUE TRIBUNE	
	ASSOCIATED PRESS	MS SUE HOLMS
	BELEN NEWS BULLETIN	
	CATRON CO FIRESTARTER	
	CIBOLA COUNTY NEWS	MS MEG DESMOND
	DEFENSOR CHIEFTAIN	
	EL HISPANO	
	GALLUP INDEPENDENT	
	GRANTS BEACON	
	LINCOLN COUNTY NEWS	
	LOS LUNAS VILLAGE VOICE	
	MAGDALENA MOUNTAIN MAIL	JACKY L BARRINGTON
	NM LOBO	UNM, UNIV P O
	SIERRA COUNTY SENTINEL	
	THE HERALD	
	UNITED PRESS INT	
	VALENCIA COUNTY NEWS	
	WHITE MOUNTAIN INDEPENDENT	
MEDIA RADIO	KABQ RADIO STA	
	KARS RADIO STA	
	KDAZ RADIO STA	
	KHFM RADIO STA	
	KKIM RADIO STA	
	KOB RADIO STA	
	KQEO RADIO STA	MR ART LLOYD, JR. NEWS DIRECTOR
	KRKE RADIO STA	
	KRST RADIO STA	
	KRZY RADIO STA	
	KSRC RADIO STA	
	KUNM RADIO STA	
	KZIA RADIO STA	

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MEDIA TV	KGGM-TV	
	KOAT-TV	
	KOB-TV	
MEDIA PERIODICALS	FARM AND RANCH	
	FARMERS & RANCHERS JOURNAL	GENERAL MANAGER
	HIGH COUNTRY NEWS	
	NEW MEXICO STOCKMAN	
	NEW MEXICO WILDLIFE	
	W TEXAS LIVESTOCK WEEKLY	
CONGRESSIONAL DELEGATION		STATE REP HENRY SAAVEDRA
		STATE REP JAMES L MARTIN
		STATE REP RON GENTRY
		STATE REP WALTER MARTINEZ
		STATE SEN BEN D ALTAMIRANO
		STATE SEN WILLIE M CHAVEZ
		STATE SENATOR JOE FIDEL
		US REP JOE SKEEN
		US REP MANUEL LUJAN
		US SENATOR HARRISON SCHMITT
		US SENATOR PETE V DOMENICI
FEDERAL AGENCIES	ALAMO BAND OF THE NAVAJO NAT	JESSIE APACHITO CHAPTER PRESIDENT
	ENV PROTECTION AGENCY	
		REGION VI
	US DEPT OF ARMY CORPS OF ENG	DISTRICT OFFICE SWDPA
	US DEPT OF COMMERCE	ENV AFFAIRS
	US DEPT OF ENERGY	ENERGY RES & DEV
	US DEPT OF HOUSING & URBAN DEV	DIRECTOR, OFFICE OF ENV QLTY
	US F&WS BOSQUE REFUGE	MR RON PERRY
	USDA ASC	
	USDA ASC STATE OFFICE	STATE DIRECTOR
	USDA FHA	
		STATE DIRECTOR
	USDA FOREST SERVICE	
		MR JERRY ENGEL, SUPERVISORS OFFICE
		REG FORESTER, LANDS & MINERALS
		SOIL & WATER
	USDA SOIL CONSERVATION SERVICE	AREA MANAGER
		DISTRICT CONSERVATIONIST
		FIELD OFFICE
		ST CONSERVATIONIST
	USDI ADV COUNCIL ON HIST PRES	
	USDI BUR OF MINING INSPECTION	ENERGY & MINERALS
	USDI BUREAU OF INDIAN AFFAIRS	
		MR BERNARD BURNHAM,
		MR MICHAEL SMITH, E NAVAJO AGENCY
	USDI BUREAU OF RECLAMATION	
		NM REPRESENTATIVE
	USDI FISH & WILDLIFE SERVICE	AREA MANAGER
		FIELD SUPERVISOR
		REGIONAL DIRECTOR
	USDI NATIONAL PARK SERVICE	REGIONAL DIRECTOR, SW REGION

WEST SOCORRO RANGELAND MANAGEMENT PROGRAM EIS MAILING LIST

FEDERAL AGENCIES	USDI NATURAL RESOURCES LIBRARY	GIFTS AND EXCHANGES SECTION
	USDI OEPR	MR RAYMOND P CHURAN
	USDI OFFICE OF SURFACE MINING	
	USDI USGS	
		CONSERVATION DIV
	USDI-BUREAU OF RECLAMATION	RIO GRANDE PROJECT
	USDI-USGS	MR BRENNAN ORR
STATE AGENCIES	ARIZONA STATE CLEARINGHOUSE	MRS JO YOUNGBLOOD
	GOVERNOR OF ARIZONA	HONORABLE BRUCE BABBIT
	GOVERNOR OF NEW MEXICO	HONORABLE BRUCE KING
	MRG COUNCIL OF GOV	
	MRGCD	
	MUSEUM OF NEW MEXICO	LAB OF ANTHROPOLOGY
	NM DEPT OF AGRICULTURE	MR MIKE BODENCHUK
		MR WAYNE GYULAI
		SECRETARY
	NM DEPT OF GAME & FISH	
		MR JACK KELLY
		MR SCOTT BROWN
	NM DIV OF STATE FORESTRY	
		MR GEORGE H HARTWELL
	NM ENERGY & MINERALS DEPT	
	NM ENV IMPROVE DIV	
	NM NATURAL HISTORY INST	MR HENRY ZELLERS
		MR ROGER S PETERSON
	NM NATURAL RES DEPT	MS KATE WICKES
	NM OFFICE OF INDIAN AFFAIRS	
	NM ST HERITAGE PROGRAM	
	NM ST HWY DEPART	
	NM STATE ENG'S OFFICE	
	NM STATE HIST PRES OFFICER	ST PLANNING OFFICE
	NM STATE LAND OFFICE	MR ALEX ARMIJO
	NM STATE PARK & REC COM	
	NMSU,COOP EXT SERVICE	DR JAMES KNIGHT
	RANGE IMPROVEMENT TASK FORCE	COORDINATOR
	SOUTHERN RIO GRANDE COG	
	STATE PLANNING DIVISION	DEPT OF FIN & ADMIN
	SW NM COG	PLANNING COORDINATOR
	UNM,BIOLOGY DEPT	DR CLIFFORD CRAWFORD
LOCAL GOVERNMENTS		GRANTS CITY MANAGER
	APACHE COUNTY	CHAIRMAN, BOARD OF SUPERVISORS
	CATRON COUNTY	BOARD OF COUNTY COMMISSIONERS
	CIBOLA COUNTY	BOARD OF COUNTY COMMISSIONERS
	CITY OF GRANTS	
	CITY OF SOCORRO	
	GREENLEE COUNTY	CHAIRMAN, BOARD OF SUPERVISORS
	MAYOR OF BELEN	HONORABLE BOLESLO LOVATO
	MAYOR OF CLIFTON	HONORABLE THOMAS AGUILAR
	MAYOR OF GRANTS	HONORABLE DAVE ZERWAS
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HEARINGS

Formal public hearings will be held on this Draft EIS. Dates and times for these hearings are as follows:

7 p.m., June 8, 1982, Community Room, Grants State Bank, Grants, New Mexico.

7 p.m., June 9, 1982, Community Hall, Datil, New Mexico.

Persons that desire to testify at either of the above hearings are asked to submit the registration form in the map pocket at the back of this EIS by June 4, 1982. Notices of these dates and times will also be announced in advance in the news media and the Federal Register.

TEAM ORGANIZATION

This statement was prepared by a team of BLM professionals from the BLM Socorro District Office and the BLM New Mexico State Office. Report writers, support personnel and other contributors to the EIS effort are indicated in Table IV-1.

Table IV-1

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APPENDICES

APPENDIX A

Soils

METHODOLOGY FOR DETERMINING WIND ERODIBILITY GROUPS

Soils were placed in wind erodibility groups (WEG) according to the texture of the surface inch of soil, unless very wet or stony, according to the following SCS technical guide (1976). See column J, Table A-1 for DPA soils' WEG ratings.

Guide for Estimating WEG from Soil Textures

Texture of Surface Inch	WEG
Very fine sand, fine sand, and medium sand	1
Loamy sand, loamy fine sand	2
Very fine sandy loam, fine sandy loam, sandy loam	3
Clay, silty clay, noncalcareous clay loam and silty clay loam with less than 35 percent clay content	4
Calcareous loam and silt loam; calcareous clay loam and silty clay loam with less than 35 percent clay content	4L
Noncalcareous loam and silt loam with less than 20 percent clay content; sandy clay loam, sandy clay	5
Noncalcareous loam and silt loam with more than 20 percent clay content; noncalcareous clay loam with less than 35 percent clay content	6
Silt; noncalcareous silty clay loam with less than 35 percent clay content	7
Very wet or stony; not subject to wind erosion	8

The adjectives to be used in describing the soil blowing hazard based on WEG are:

WEG-1	Very High Soil Blowing Hazard
WEG-2	Very High Soil Blowing Hazard
WEG-3	High Soil Blowing Hazard
WEG-4	High Soil Blowing Hazard
WEG-4L	High Soil Blowing Hazard
WEG-5	Moderate Soil Blowing Hazard
WEG-6	Moderate Soil Blowing Hazard
WEG-7	Moderate Soil Blowing Hazard
WEG-8	Slight Soil Blowing Hazard

Table A-1

PHYSICAL PARAMETERS OF SOILS
(By General Soil Group)

A	B	C	D	E			F	G	H	I	J	K	L			
				Soil Textures in Typical Pedon and Depth in Inches To Restrictive Layer									Present Sediment Yield Class - by Management Category			
Soil Mapping Unit	Major Mapping Unit Components	Percent of Unit	Percent Slope Range	Surface	Subsoil	Substratum	Percent Course Fragments (>2mm)	Permeability (in./hr.)	Total Available Water Capacity (in./in.)	pH Range	Wind Erodibility Group (WEG)	Water Erosion Hazard	B	D	E	F
1. DEEP, WELL DRAINED, NEARLY LEVEL TO GENTLY SLOPING SOILS ON SWALES AND PLAYAS.																
Pietown - Hickman Complex	Pietown	45	0-5	FSL, SIL		FSL, LFS	0-15	2.0-6.0	5.0-7.5	7.4-8.4	4L	Moderate	5	5	-	5
	Hickman	30	0-5	VFSL		CL	0-15	0.2-0.6	>10.0	7.4-9.0	3	Moderate				
Manzano Clay Loam	Manzano	80	0-5	CL		SICL + CL	0-15	0.2-0.6	7.5-10.0	6.6-8.4	6	Slight	4	-	4	4
Catman - Hickman Complex	Catman	50	1-5	SIC		SIC, C	0-15	<0.06	7.5-10.0	7.9-9.0	4	Moderate	4	4	4	4
	Hickman	25	1-5	VFSL		CL	0-15	0.2-0.6	<3.75	7.4-9.0	3	Moderate				
Catman Silty Clay	Catman	90	0-2	SIC		SIC + C	0-15	<0.06	7.5-10.0	7.9-9.0	4	Moderate	4	-	-	-
Albinas - Datil Complex	Albinas	40	1-5	SL	SCL, SCL	SCL	0-15	0.6-2.0	7.5-10.0	6.6-7.9	3	Moderate	5	-	-	5
	Datil	30	1-5	L	CL	GRL, SL	0-15	0.2-0.6	7.5-10.0	7.4-8.4	5	Moderate				
Millpaw - Datil Complex	Millpaw	45	0-7	L	CL, C	SCL	0-15	0.06-0.2	7.5-10.0	6.6-8.4	6	Slight	-	4	-	4
	Datil	45	1-7	FSL	SCL	L	0-15	0.6-2.0	5.0-7.5	7.4-8.4	3	Moderate				
Ustifluvents	Ustifluvents	90	0-5	FSL	SL	SL	0-15	2.0-6.0	5.0-7.5	*	3	Severe	5	-	-	-
2. SHALLOW TO DEEP, WELL DRAINED, GENTLY SLOPING TO VERY STEEP SOILS, ON MESA TOPS, ROLLING RIDGES AND VERY STEEP SIDE SLOPES.																
Ralphston - Amenson Complex	Ralphston	50	1-9	L	CL L	L	0-15	0.2-0.6	3.75-5.0	7.9-9.0	5	Slight	5	-	-	5
	Amenson	25	1-4	L	CL	<20" Indurated Caliche	0-15	0.2-0.6	<3.75	7.4-9.0	5	Slight				
Datil - Dioxice** Complex	Datil	50	0-5	FSL	CL	GR SL	0-15	0.2-0.6	5.0-7.5	6.6-8.4	4L	Slight	5	5	-	5
	Dioxice	30	1-5	GR SL	L, GR L	GR SL, L	0-35	0.6-2.0	>7.5	7.4-8.4	4L	Slight				
Cabezon - Thunderbird Celsosprings Complex	Cabezon	45	3-25	C, CB C	CB C, C	<20" Basalt	0-15	.06-0.2	<3.5	6.1-7.3	4	Slight	5	5	4	5
	Thunderbird	25	3-15	SIL	C	20-30" Basalt	0-15	.06-0.2	3.75-5.0	6.6-8.4	4	Moderate				
	Celsosprings	15	3-8	SIL	C	20-30" Basalt	0-15	.06-0.2	5-7.5	6.6-8.4	4	Moderate				
Celsosprings Stony Loam	Celsosprings	30	1-8	L	GRCL, CL	40-50" Basalt	0-15	0.06-0.2	>7.5	6.6-8.4	4	Moderate	5	-	-	5
		40	1-4	STL	GRCL, GRC	40-50" Basalt	0-15	0.06-0.2	>7.5		4	Slight				
Cabezon - Rock Outcrop Complex	Cabezon	40	0-10	CB SIL	CB CL+	10" Basalt	30-40	0.06-0.2	<3.75	6.1-7.3	4	Moderate	-	5	-	-
	Rock Outcrop	40	10-50													
Aridic Argiustolls - Rock Outcrop Complex	Aridic Argiustolls	70	15-45	CB L	CB CL, L	VFSL, L	15-35	0.2-20	3.75-7.5	*	8	Moderate	5	4	-	4
	Rock Outcrop	30														
Rudd - Modyon Complex	Rudd	40	3-15	GRL	CBL CBCL	20" Basalt	>-35	0.6-2.0	<3.75	7.9-8.4	4L	Slight	5	-	-	5
	Modyon	30	3-15	CBL	CBL VCBL	28" Basalt	>35	0.6-2.0	<3.75	7.9-8.4	4L					
Ceniza - Gatlin Complex	Ceniza	55	1-15	EXGRL		VGRL, 30" Cinders	>35	0.6-2.0	<3.75	7.4-9.0	8	Slight	5	-	-	-
	Gatlin	35	1-15	VGRL		VGRL, EXGRL	>40	0.6-2.0	<3.75	7.4-9.0	5	Moderate				
Amenson - Gustspring Complex	Amenson	40	2-7	L	CB L	CBL, 18" Petrocalcic	0-35	0.6-2.0	<3.75	7.4-9.0	6	Slight	5	-	-	5
	Gustspring	35	2-7	L	GRCL, GRSCL	GRSL	0-35	0.2-0.6	5.0-7.5	6.6-8.4	5	Moderate				
Majada - Lapdun Complex	Majada	45	1-8	VCBL	VCBL VCBCL	VCBL	<35	0.6-2.0	5.0-7.5	7.9-9.0	8	Slight	5	-	-	-
	Lapdun	35	1-8	VCBL	VCBL	VCBLS	<35	0.6-2.0	3.5-5.0	8.0-8.7	8	Slight				
Cabezon - Torreon Association	Cabezon	30	5-25	L	CL	GRL, 20" Basalt	0-15	0.06-0.2	3.75-5.0	6.1-7.3	4	Slight	-	5	-	5
	Torreon	25	0-5	SL	CL	L, 20-40" Basalt	0-15	0.06-0.2	5.0-7.5	6.6-7.8	3	Slight				
Cabezon - Capulin - Bandera Association	Cabezon	30	5-15	CBCL	CBC	SCL, 20" Basalt	15-35	0.06-0.2	<3.75	6.1-7.3	7	Moderate	-	5	-	-
	Capulin	25	3-7	L	CL	CL	0-15	0.6-2.0	7.5-10.0	6.6-7.8	5	Moderate				
	Bandera	20	12-60	VGRSL	VGRSL	GRSL	15-35	0.6-2.0	<3.75	6.6-8.4	4L	Slight				

Table A-1 (continued)

PHYSICAL PARAMETERS OF SOILS
(By General Soil Group)

A	B	C	D	E			F	G	H	I	J	K	L			
Soil Mapping Unit	Major Mapping Unit Components	Percent of Unit	Percent Slope Range	Soil Textures in Typical Pedon and Depth in Inches To Restrictive Layer			Percent Course Fragments (>2mm)	Permeability (in./hr.)	Total Available Water Capacity (in./in.)	pH Range	Wind Erodibility Group (WEG)	Water Erosion Hazard	Present Sediment Yield Class - by Management Category			
				Surface	Subsoil	Substratum							B	D	E	F
Capulin - Torreon Association	Capulin	50	1-5	L	CL	SCL	0-15	0.6-2.0	7.5-10.0	6.6-7.8	4L	Moderate	5	-	-	-
	Torreon	35	0-3	L	CL	L	0-15	0.06-0.2	7.5-10.0	6.6-7.8	4L	Slight				
Raton - 8arela Association	Raton	55	0-5	L	CL	CL, 20" Basalt	0-15%	0.06-0.2	<3.75	6.6-7.3	6	Slight	-	-	-	5
	8arela	30	0-5	SIL	CL	CL	0-15	0.06-0.2	3.75-5.0	6.6-7.3	6	Slight				
Hubbell Loamy Sand	Hubbell	85	1-9	LS	STR	L, SL, LS	0-15	0.6-2.0	3.5-5.0	7.9-9.0	2	Moderate	-	-	-	5
3. SHALLOW TO DEEP, WELL DRAINED, SLOPING TO STEEP SOILS; ON PLAINS, ALLUVIAL FANS, AND HILLS.																
Flugle - Typic** Ustorthents Association	Flugle	35	2-15	SL	SCL	SL	0-15	0.6-2.0	7.5-10.0	7.4-9.0	2	Moderate	4	-	-	4
	Typic Ustorthents	35	5-20	SL		SL	0-15	0.6-2.0	5.0-7.5	*	3	Moderate				
Gustspring - Guy - Typic Ustorthents Complex	Gustspring	25	1-5	LS	GRSCL	EXGRLS	0-35	0.6-2.0	<3.75	6.6-8.4	2	Moderate	5	5	-	5
	Guy	25	3-10	GRSL	GRSL	GRSL GRLS	15-35	2.0-6.0	3.5-5.0	7.9-8.4	3	Moderate				
	Typic Ustorthents	20	1-10	GRSL	SL	42" Sandstone	0-15	2.0-6.0	3.5-5.0	*	3	Moderate				
Gustspring - Aridic Ustochrepts Complex	Gustspring	35	5-15	VGRSL	GRSCL	GRLS	0-15	0.6-2.0	3.75-5.0	6.6-8.4	3	High	4	4	-	5
	Aridic Ustochrepts	30	5-40	GRSL	GRFSL	GRLS	15-35	0.6-2.0	3.75-5.0	*	5	High				
Goesling - Celacy Complex	Goesling	50	0-10	LS	SCL	SCL, SC	0-15	0.6-2.0	7.5-10.0	6.6-8.4	3	Moderate	5	5	-	-
	Celacy	35	5-10	SL	SCL, CL	20-40" Sandstone	0-15	0.6-2.0	3.75-5.0	7.4-8.4	3	Moderate				
Mion - Travessilla** Rock Outcrop Complex	Mion	35	2-30	GRCL		C, 20" Sandstone	0-15	0.05-0.2	<3.75	7.9-8.4	6	High	5	4	-	4
	Travessilla	25	2-30	VGRSL	C8SL	20" Sandstone	15-35	2.0-6.0	<3.75	6.6-7.8	4L	Moderate				
Goesling - Flugle - Orthents Complex	Goesling	35	1-8	LFS	SCL	SL, L	0-15	0.6-2.0	7.5-10.0	6.6-8.4	2	Moderate	-	5	-	-
	Flugle	25	1-8	LFS	SCL	L, SL	0-15	0.6-2.0	7.5-10.0	7.4-9.0	2	Slight				
	Orthents	20	1-8	LS		LS, SCL, SL	0-15	0.6-2.0	5.0-7.5	*	2	Moderate				
Orthents - Badland Complex	Orthents	60	5-25	GRL		CL, 20" Shale	0-35	0.2-0.6	<3.75	*	8	Moderate	3	4	-	-
	Badland	20	5-25				5-25									
Rock Outcrop - Ustorthents - Torriorthents Complex	Rock Outcrop	45	3-55										5	4	-	-
	Ustorthents	20	3-55	L		CL, 12" Shale	0-15	0.6-2.0	<3.75	*	4L	High				
	Torriorthents	20	3-55	SL		SCL, 7" Sandstone	0-15	0.6-2.0	<3.75	*	3	High				
Flyer - Ustochrepts - Haverson Complex	Flyer	30	1-8	SL	CL, SCL	SCL	0-15	0.2-0.6	7.5-10.0	7.4-9.0	3	Slight	-	5	-	-
	Ustochrepts	30	1-8	L	CL	L	0-15	0.2-0.6	7.5-10.0	*	4L	Slight to Mod.				
	Haverson	15	1-4	L		STRL, CL, SL, FSL	0-15	0.2-0.6	7.5-10.0	6.6-8.4	5	Moderate				
Unnamed - Montecito - Wineg Variant Complex	Unnamed	35	0-3	L	L	GRL, 20" Petrocalcic	0-15	0.6-2.0	<3.75	*	4L	Slight	-	-	-	-
	Montecito	20	0-3	C8SL	C	L, GRL	15-35	<0.06	7.5-10.0	6.6-8.4	4	Slight				
	Wineg Variant	20	0-3	L	L	L, SL	0-15	0.6-2.0	5.0-7.5	6.5-8.4	5	Slight				
Celacy - Rock Outcrop Association	Celacy	45	2-9	LS	SCL	20-40" Sandstone	0-15	0.6-2.0	<3.75	7.4-8.4	2	Slight	3	4	-	-
	Rock Outcrop	25														
8resser - Mion - Celacy Association	8resser	30	1-10	L	SICL, C	20-40" Shale	0-15	0.06-0.2	3.75-5.0	6.1-7.3	5	Moderate	5	4	-	4
	Mion	30	1-10	L	CL	20" Shale	0-15	0.06-0.2	<3.75	7.9-8.4	5	Moderate				
	Celacy	20	1-10	L	CL, SCL	20-40" Shale, Sandstone	0-15	0.6-2.0	3.75-5.0	7.4-8.4	5	Moderate				
Typic Ustorthents - Hickman - Majada Association	Typic Ustorthents	30	3-25	FSL		L, VFSL 20-40" Sandstone	0-15	0.6-2.0	5.0-7.5	*	3	Moderate	4	4	-	4
	Hickman	30	1-3	L		STRL, CL, SCL	0-15	0.2-0.6	7.5-10.0	7.4-9.0	4L	Slight				
	Majada	15	35-65	CBVSL	VCBSL	EXSTL	35-65	0.6-2.0	<3.75	7.9-9.0	8	Slight				
Oatil - Loarc Association	Oatil	40	1-15	SL	SCL	L	0-15	0.6-2.0	7.5-10.0	6.6-8.4	3	Slight	5	-	-	4
	Loarc	40	1-8	SL	SCL, GRSL	SL, LS	0-15	0.6-2.0	5.0-7.5	6.6-9.0	3	Slight				

Table A-1 (continued)

PHYSICAL PARAMETERS OF SOILS
(By General Soil Group)

A Soil Mapping Unit	B Major Mapping Unit Components	C Percent of Unit	D Percent Slope Range	E Soil Textures in Typical Pedon and Depth in Inches To Restrictive Layer Surface	 Subsoil	 Substratum	F Percent Course Fragments (>2mm)	G Permeability (in./hr.)	H Total Available Water Capacity (in./in.)	I pH Range	J Wind Erodibility Group (WEG)	K Water Erosion Hazard	L Present Sediment Yield Class - by Management Category B	 D	 E	 F
4. SHALLOW TO DEEP, WELL DRAINED, UNDULATING TO STEEP SOILS; ON UNDULATING FANS, ROLLING RIDGES, HILLS AND ESCARPMENTS.																
Tejana - Rock Outcrop Complex	Tejana	60	3-15	VGRL	VGRL	SCL	0-15	0.6-2.0	3.75-5.0	7.2-8.6	7	Moderate	4	4	-	-
	Rock Outcrop	20														
Oatil - Guy Association	Oatil	40	3-10	SL	SCL	GRSL, GRL	0-15	0.6-2.0	5.0-7.5	6.6-8.4	3	Moderate	*	-	-	-
	Guy	35	3-15	GRSL	GRSL	GRL	15-35	0.6-2.0	5.0-7.5	7.9-8.4	3	Slight				
Ustic Torriorthents - Rock Outcrop - Badland Complex	Ustic Torriorthents	30	20-100	SL		STRL, SL, LS, C 20" Sandstone, Shale	0-15	0.06-0.2 to 20	3.75-7.5	*	4	Mod. to High	4	4	-	5
	Rock Outcrop	20	20-100													
	Badland	20	20-100													
Oatil - Loarc Association	Oatil	35	4-20	CBL	GRCL	SL	15-35	0.2-0.6	5.0-7.5	6.6-8.4	5	Slight	5	-	-	4
	Loarc	35	2-8	SL	SCL	SCL, SL, LS	0-15	0.6-0.2	5.0-7.5		3	Slight				
Loarc - Flugle - Manzano Association	Loarc	40	2-6	SL	SCL	SL	0-15	0.6-2.0	5.0-7.5	6.6-9.0	3	Moderate	4	-	-	5
	Flugle	30	2-9	SL	SCL	SC	0-15	0.6-2.0	5.0-7.5	7.4-9.0	3	Moderate				
	Manzano	20	1-2	L	CL	L	0-15	0.6-2.0	>10.0	6.6-7.8	5	Slight				
5. SHALLOW TO DEEP, WELL DRAINED, SLOPING TO STEEP SOILS; ON FANS, HILLY SIDE SLOPES AND PIEDMONT RIDGES.																
Millett - Sedillo Association	Millett	50	1-15	GRFSL	GRCL	VGRL, VGRFSL	35-60	0.6-2.0	7.5-10.0	7.9-8.4	4	Moderate	4	-	-	5
	Sedillo	30	1-15	VGRL	VGRCL + SCL	VGRSL	35-60	0.6-2.0	5.0-7.5	7.4-9.0	6	Moderate				
Faraway - Motoqua - Rock Outcrop Complex	Faraway	30	8-30	VSTL	VCBSCL	20" Tuff	35+	0.6-2.0	<3.75	6.6-7.3	8	Moderate	5	-	-	5
	Motoqua	25	8-30	VCBL	EXCBL	20" Tuff	35+	0.6-2.0	<3.75	6.6-7.8	8	Moderate				
	Rock Outcrop	20	8-30													
Abrazo - Rock Outcrop Complex	Abrazo	60	15-15	GRL	CBC, CL	20" Tuff	15-35	0.06-0.2	3.75-5.0	6.6-7.8	7	Moderate	4	-	-	4
	Rock Outcrop															
Guy Gravelly Loamy Fine Sand	Guy	70	0-12	GR LFS		GR FSL	15-35	2.0-6.0	5.0-7.5	7.9-8.4	2	Moderate	5	-	-	-
Pena - Oatil Complex	Pena	60	5-35	GRL	GRL	VGRL	15-35	0.6-2.0	3.75-5.0	7.4-8.4	6	Moderate	4	-	-	-
	Oatil	20	5-15	SL	SCL	SL	0-15	0.6-2.0	7.5-10.0	7.4-8.4	3	Moderate				
Goldust Gravelly Loam	Goldust	80	2-8	GR SCL, CBC	GRC	VCOBC	35-60	0.06-0.2	5.0-7.5	7.0-8.4	6	Low	-	-	-	4
Oatil Association	Oatil	80	10-25	GRL	GRCL	L	15-35	0.6-2.0	7.5-10.0	7.4-8.4	5	Moderate	5	-	-	-
Motoqua - Rock Outcrop Complex	Motoqua	60	8-30	VGRL	VCBCL	20" Tuff	35+	0.2-0.6	<3.75	6.6-7.8	7	Moderate	5	-	-	5
	Rock Outcrop	20														
Maia Sandy Loam	Maia	80	1-8	SL	GRCL, C	GRL	15-35	0.2-0.6	5.0-7.5	6.6-9.0	3	Slight	*	-	-	-
Celsosprings Loam	Celsosprings	75	1-8	L	COB CL, C	GRCL, L	15-35	0.06-0.2	7.5-10.0	6.3-7.8	6	Moderate	5	-	-	-
Joachem - Rock Outcrop Complex	Joachem	50	3-15	GRSL	CBL	VCBL 20" Tuff	35+	0.6-2.0	<3.75	7.4-9.0	4	Slight	5	-	-	5
	Rock Outcrop	15	3-15													
Abrazo - Apache Complex	Abrazo	35	2-10	L	GR CL	VGRCL 20-40" Tuff	15-35	0.2-0.6	5.0-7.5	6.6-7.8	6	Slight	5	-	-	5
	Apache	30	6-15	GRSL	L	GRSL 20" Conglomerate	15+	0.6-2.0	<3.75	7.4-8.4	3	Moderate				
6. SHALLOW TO DEEP, WELL DRAINED, UNDULATING TO STEEP SOILS; ON UNDULATING RIDGES AND HILLS.																
Jacee - Celacy - Rock Outcrop Association	Jacee	40	0-5	L	CL	C, 20-40" Sandstone	0-15	0.06-0.2	3.75-5.0	6.1-7.3	5	Slight	-	4	-	4
	Celacy	20	2-9	FSL	SCL	FSL, 20-40" Sandstone	0-15	0.6-2.0	3.75-5.0	7.4-8.4	3	Moderate				
	Rock Outcrop	15														
Mion - Catman Association	Mion	40	5-17	GRCL	CL, C	20" Shale	0-15	<0.06	<3.75	7.9-8.4	6	High	-	-	-	3
	Catman	25	2-5	CL		C	0-15	0.06-0.2	7.5-10.0	7.9-9.0	6	Moderate				
Royosa Fine Sand	Royosa	80	3-15	FS		LS, S	0-15	6.0-2.0	<3.75	6.6-7.8	1	Moderate	*	-	-	-

Table A-1 (continued)

PHYSICAL PARAMETERS OF SOILS
(By General Soil Group)

A	B	C	D	E			F	G	H	I	J	K	L			
Soil Mapping Unit	Major Mapping Unit Components	Percent of Unit	Percent Slope Range	Soil Textures in Typical Pedon and Depth in Inches To Restrictive Layer			Percent Course Fragments (>2mm)	Permeability (in./hr.)	Total Available Water Capacity (in./in.)	pH Range	Wind Erodibility Group (WEG)	Water Erosion Hazard	Present Sediment Yield Class - by Management Category			
				Surface	Subsoil	Substratum							B	D	E	F
7. SHALLOW TO DEEP, WELL DRAINED, MODERATELY UNDULATING SOILS ON PLAINS.																
Cabezon - Thunderbird - Rock Outcrop Complex	Cabezon	35	B-15	L	CL	GRL, 20" Basalt	0-15	0.06-0.2	<3.75	6.1-7.3	5	Slight	5	5	-	5
	Thunderbird	25	8-15	L	CL	5CL, 20-40" Basalt	0-15	0.06-0.2	5.0-7.5	6.6-8.4	5	Moderate				
	Rock Outcrop	25														
B. DEEP, WELL DRAINED, NEARLY LEVEL TO MODERATELY UNDULATING SOILS ON FANS, PLAINS, AND SWALES.																
Telescope Loamy Fine Sand	Telescope	85	3-10	LFS	SL	GR, F5L	0-15	2.0-6.0	5.0-7.5	6.6-7.B	2	Slight	5	-	-	-
Loarc - Oatil Complex	Loarc	40	1-8	SL	SCL	SCL	0-15	0.6-2.0	7.5-10.0	6.6-9.0	3	Slight	4	-	-	-
	Oatil	40	1-8	FSL	CL	L	0-15	0.2-0.6	7.5-10.0	6.6-8.4	2	Moderate				
Oatil - Oioxice Association	Oatil	35	3-15	GRL	GRCL	GR, L	0-15	0.2-0.6	7.5-10.0	6.6-8.4	7	Moderate	5	-	-	5
	Oioxice	35	3-15	GRL	L	EXGR5L	15-35	0.6-2.0	5.0-7.5	7.4-B.4	5	Moderate				
Augustine Fine Sandy Loam	Augustine	75	1-6	FSL	CL	L	0-15	0.2-0.6	>10	7.2-B.0	3	Slight	5	-	-	-
Guy - Oioxice Complex Soc.	Guy	35	1-6	L	SCL	SL	0-15	0.6-2.0	5.0-7.5	7.9-B.4	5	Moderate	5	-	-	-
	Oioxice	30	1-4	L	5CL	5L	0-15	0.6-2.0	5.0-7.5	7.4-8.4	5	Moderate				
Loarc - Telescope Complex	Loarc	60	0-3	LS	5CL	SL	0-15	0.6-2.0	5.0-7.5	6.6-9.0	2	Slight	5	-	-	-
	Telescope	25	0-3	LS	5L	LS	0-15	2.0-6.0	3.75-5.0	6.6-7.B	2	Slight				
Telescope Loamy Sand	Telescope	75	0-3	L5	5L	L5	0-15	2.0-6.0	3.75-5.0	6.6-7.8	2	Slight	5	-	-	-
Loarc Loamy Sand	Loarc	B5	1-12	5L	5CL, CL	5L	0-15	0.2-0.6	7.5-10.0	6.6-9.0	3	Moderate	5	5	-	-
Oatil Gravelly Fine Sandy Loam	Oatil	B5	0-6	GRFSL	GRCL, GR GRL	SCL, GR5L	15-60	0.2-0.6	6.3-7.1	6.6-B.4	3	Moderate	-	-	-	4
Cerrillos - Penistaja - Clovis Association	Cerrillos	30	1-10	F5L	CL	SCL	0-15	0.6-2.0	6.6-10.0	7.9-8.4	3	Moderate	-	-	-	5
	Penistaja	30	1-6	F5L	5CL, CL	5L, FSL, 5CL	0-15	0.6-2.0	6.6-10.0	6.6-8.4	3	Moderate				
	Clovis	20	1-5	FSl	SCL, CL, L	VF5L, F5L, L	0-15	0.6-2.0	6.6-10.0	7.4-B.4	3	Moderate				
9. SHALLOW TO DEEP, WELL DRAINED, NEARLY LEVEL TO STEEP SOILS; ON BASALT FLOWS, SWALES, AND STEEP DISSECTED SLOPES OF VOLCANO CONES.																
Rock Outcrop Haplustaifs Complex	Rock Outcrop	50											-	-	-	4
	Haplustaifs	30	30-50	L	5CL	SL, 20-40" Sandstone	0-15	0.6-2.0	3.75-5.0	*	5	High				
Smilo - Adman Complex	Smilo	40	0-4	CBSL	CBL, CL	GRCL, 20-40" Basalt	15-35	0.06-0.2	5.0-7.5	6.1-7.3	4	Slight	5	5	5	5
	Adman	30	2-9	CL	C, CL	CL, 20" Basalt	15-35	0.2-0.6	<3.75	6.6-7.3	8	Slight				
Rock Outcrop** - Aridic Ustochrepts	Rock Outcrop	40	10-25										5	5	5	-
	Aridic Ustochrepts	40	10-25	GRSL	SL, LS	20" Tuff	0-15	0.06-0.2 20"	<3.75 to 10.0	*	4L	Low to High				
Rock Outcrop - Torriorthents Complex	Rock Outcrop	75	25-100										*	-	-	-
	Torriorthents	15	25-100	STL		L, 20" Basalt	15-35	0.6-0.2	<3.75	*	7	High				
Rock Outcrop - Torriorthents Association	Rock Outcrop	65	25-90										*	-	-	-
	Torriorthents	25	25-60	L		L, 20" Basalt	0-15	0.6-2.0	<3.75	*	5	V. High				
Tolman - Rock Outcrop Complex	Tolman	45	25-60	EXCBL	VCBCL	20" Tuff	35-60	0.2-0.6	<3.75	6.1-7.B	B	Moderate	4	5	4	4
	Rock Outcrop	35	25-60													
Brycan Loam	Brycan	B0	0-3	L	L	L, SL	0-15	0.6-2.0	7.5-10.0	6.6-7.B	6	Moderate	4	-	-	-
Coni - Tolman Complex	Coni	50	10-35	VGRSL	GR CL	EXGRCOS, 20" Tuff	15-35	0.2-0.6	<3.75	6.1-7.3	5	V. High	5	-	5	-
	Tolman	30	10-40	CBL	VCBL	20" Basalt	15-35	0.2-0.6	<3.75	6.6-7.8	7	High				
Smilo - Adman Complex	5milo	55	3-15	STL	CBCL, CB C	20-40" GRCL	15-35	0.2-0.6	3.75-5.0	6.1-7.3	B	Slight	5	-	-	5
	Adman	25	3-15	STL	CBCL, CBC	20" Basalt	0-15	0.2-0.6	<3.75	6.6-7.3	8	Slight				

Table A-1 (continued)

PHYSICAL PARAMETERS OF SOILS
(By General Soil Group)

A	B	C	0	E			F	G	H	I	J	K	L			
Soil Mapping Unit	Major Mapping Unit Components	Percent of Unit	Percent Slope Range	Soil Textures in Typical Pedon and Depth in Inches To Restrictive Layer			Percent Course Fragments (>2mm)	Permeability (in./hr.)	Total Available Water Capacity (in./in.)	pH Range	Wind Erodibility Group (WEG)	Water Erosion Hazard	Present Sediment Yield Class - by Management Category			
				Surface	Subsoil	Substratum							B	D	E	F
10. SHALLOW TO DEEP, WELL ORAINED, NEARLY LEVEL TO STEEP SOILS; ON SWALES, DISSECTED VOLCANIC PLAINS ANO STEEP SIDE SLOPES.																
Valnor - Midnight Association	Valnor Midnight	45 30	1-7 3-25	FSL VGRL	SCL, CL VCBCL	20-40" Shale 20" Shale	0-15 >35	0.05-0.2 0.2-0.6	5.0-7.5 <3.75	6.6-8.4 6.6-7.8	3 7	Moderate Moderate	*	-	-	-
Bario Sandy Clay Loam	Bario	80	0-5	GRSL	GRC, GRCL	GRCL	15-35	0.05-0.2	3.75-5.0	6.6-7.8	7	Severe	4	-	-	-
Pleloville Gravelly Loam	Pleloville		3-15	SCL	C, CL	CL	0-15	0.05-0.2	>10	6.6-7.8	5	Moderate	5	-	-	5
11. SHALLOW, WELL ORAINEO, NEARLY LEVEL TO STEEP SOILS; ON LAVA FLOWS.																
Lava Flows	Lava	85	0-10								8		-	-	-	5
Raton - Rock Outcrop Complex	Raton Rock Outcrop	50 35	0-15 0-35	STL	STC		15-35	0.06-0.2	>3.75	6.6-7.3	8	Moderate	5	5	-	5
12. SHALLOW TO MODERATELY DEEP, WELL ORAINED, MODERATELY ROLLING TO HILLY SOILS; ON HILLS ANO PLAINS.																
Lithic Argiborolls - Midnight Association	Lithic Argiborolls Midnight	50 3D	10-25 5-20	L L	CL+ CL+	20" Sandstone, Shale 20-40" Sandstone, Shale	0-15 0-15	0.2-0.6 0.2-0.6	<3.75 <3.75	* 6.6-7.8	6 6	Moderate Moderate	-	4	-	-
13. SHALLOW TO OEEP, WELL ORAINED, NEARLY LEVEL TO HILLY SOILS; ON ALLUVIAL FANS, MESA TOPS, ANO RIOGES.																
Tuloso - Rock Outcrop Association	Tuloso Rock Outcrop	45 30	0-20 0-30	SL	CL	20" Sandstone	0-15	0.6-2.0	<3.75	6.6-8.4	3	High	5	4	-	-
Tuloso - Bernal Complex	Tuloso Bernal	40 25	10-30 5-15	GRSL GRSL	GRL, GRSL GRCL	20" Sandstone	15-35 15-35	0.6-2.0 0.6-2.0	<3.75 <3.75	6.6-8.4 6.6-7.8	4 4	Moderate Moderate	-	4	-	-
Royosa Association	Royosa	80	1-20	LS		LCOS	0-15	6.0-20.0	<3.75	6.6-7.8	1	Slight	-	5	-	-
14. OEEP, WELL DRAINEO, NEARLY LEVEL SOILS; ON FLOOOPLAINS ANO SMOOTH RIOGES.																
Concho Silt Loam	Concho	90	0-1	SIL	CL	SL, CL	0-15	0.06-0.2	7.5-10.0	7.4-8.4	2	Low	-	5	-	-
Penistaja - Royosa Complex	Penistaja Royosa	60 20	1-15 1-15	LS LS	SCL	GRCL, GRS LCOS	0-15 0-15	2.0-6.0 6.0-20.0	5.0-7.5 <3.75	6.6-8.4 6.6-7.8	2 1	High Slight	-	5	-	-
15. SHALLOW, WELL ORAINED, GENTLY SLOPING TO VERY STEEP SOILS; ON LAVA FLOWS, CINDER CONES, ANO HILLS.																
Raton - Barela - Bandera Association	Raton Barela Bandera	30 30 15	5-15 3-7 10-45	CBL L GRL	C8FSL CL VGRL	20" Basalt SCL, SIC 28" Cinders	15-35 0-15 35+	0.6-2.0 0.6-2.0 0.6-2.0	<3.75 7.5-10.0 <3.75	6.6-7.3 6.6-8.4 6.6-8.4	8 5 8	Moderate Moderate Moderate	-	5	-	-
Kiln - Rock Outcrop Complex	Kiln Rock Outcrop	45 40	15-40	STL	STCL	20" Sandstone	15-35	0.6-2.0	<3.75	6.6-7.8	8	Moderate	4	-	-	5
16. SHALLOW TO OEEP, WELL ORAINED, NEARLY LEVEL TO MOOERATELY STEEP SOILS; ON ALLUVIAL FANS, HILLS, ANO MESAS.																
La Porte - Rock Outcrop Complex	La Porte Rock Outcrop	50 35	10-30	VCBFSL		CBSCL	35+	0.6-2.0	<3.75	7.4-8.4	8	High	5	-	-	5
Oioxice Loam	Oioxice	75	0-7	L	SCL, CL	L, SCL	0-15	0.6-2.0	7.5-10.0	7.4-8.4	4L	Slight	4	-	-	5
17. SHALLOW TO OEEP, WELL ORAINEO, UNOULATING TO EXTREMELY STEEP SOILS; ON ALLUVIAL FANS ANO HILLS.																
Santa Fe - Rock Outcrop Complex	Santa Fe Rock Outcrop	55 30	30-75	CB L	CBCL	20" Igneous Rock	15-35	0.6-2.0	<3.75	6.6-7.8	7	Moderate	*	-	-	-
Lapdun - Datil Association	Lapdun Datil	4D 3D	15-3D 1D-3D	GRSL GRSL	VCBCL VGRCL	GRSL VGRLS	15-35 35-6D	D.2-0.6 0.6-2.D	5.0-7.5 7.5-10.0	7.9-9.0 7.4-7.8	5 5	Moderate Moderate	-	-	-	5
Datil Loam*	Datil	80	3-20	L, GRL	GRCL	L	0-15	0.6-2.0	5.0-7.5	7.4-8.4	5	Moderate	5	-	-	-

Table A-1 (continued)

PHYSICAL PARAMETERS OF SOILS
(By General Soil Group)

A	B	C	D	E			F	G	H	I	J	K	L			
Soil Mapping Unit	Major Mapping Unit Components	Percent of Unit	Percent Slope Range	Soil Textures in Typical Pedon and Depth in Inches To Restrictive Layer			Percent Course Fragments (>2mm)	Permeability (in./hr.)	Total Available Water Capacity (in./in.)	pH Range	Wind Erodibility Group (WEG)	Water Erosion Hazard	Present Sediment Yield Class - by Management Category			
				Surface	Subsoil	Substratum							B	D	E	F
18. DEEP, WELL DRAINED, GENTLY SLOPING TO ROLLING SOILS; ON ALLUVIAL FANS AND PLAINS.																
Pinavetes Fine Sand	Pinavetes	70	1-9	S		S, FS	0-15	6.0-20.0	<3.75	6.6-7.8	1	Slight	5	-	-	-
Telescope - Pinavetes Association	Telescope	45	1-3	LS	FSL	FSL, LFS	0-15	2.0-6.0	<3.75	6.6-8.4	2	Slight	5	-	-	-
	Pinavetes	35	1-3	FS		FS, LS	0-15	6.0-20.0	<3.75	6.6-7.8	1	Slight				
Ildefonso - Scholle	Ildefonso	45	1-15	GRSL	VGRL	VGRSL	35-60	0.6-2.0	3.75-5.0	7.4-8.4	5	Moderate	5	-	-	-
	Scholle	30	1-8	GRL	GRCL	GRSL, L	15-35	0.6-2.0	5.0-7.5	6.6-8.4	7	Moderate				
Guy - Dioxice Complex	Guy	50	3-8	SL	GRSL, SL	CB SL	15-35	0.6-2.0	5.0-7.5	7.9-8.4	3	Slight	5	-	-	-
	Dioxice	30	3-6	L	SCL	SL	0-15	0.6-2.0	5.0-7.5	7.4-8.4	5	Moderate				
Pena Variant Loam	Pena Variant	75	10-15	L	GRSL	VGRSL	15-35	0.6-2.0	3.75-5.0	7.4-8.4	4L	Slight	5	-	-	-
19. MODERATELY DEEP TO DEEP, WELL DRAINED, NEARLY LEVEL TO HILLY SOILS ON MESA TOPS.																
Jacques Loam	Jacques	75	0-2	L	CL, C	C	0-15	0.06-0.2	5.0-7.5	7.4-8.2	5	Slight	-	-	-	-
Montecito - Unnamed Fine Typic Agriustoll[1]	Montecito	40	1-25	SL	C	L, SL	0-15	0.06-0.2	7.5-10.0	6.6-8.4	3	Slight	-	5	-	-
	Unnamed	30	1-25	L	C	SCL, 20-40" Petrocalcic	0-15	0.06-0.2	3.75-5.0	*	5	Slight				

Column: A - Soil Mapping Unit Name.

B - Soil Series (or other mapping unit component) within the Mapping Unit (does not include inclusions).

C - Percent composition of mapping unit that series (or other mapping unit component) occupies (does not total 100 percent because inclusions are not listed).

D - Percent slope.

E - Most common range of textures of surface, subsurface, and substratum.

Texture abbreviations are as follows:

C = Clay	L = Loam(y)
CO = Coarse	S = Sand(y)
CB = Cobbly	SI = Silt(y)
EX = Extremely	ST = Stony
F = Fine	STR = Stratified
GR = Gravelly	

F - Percent coarse fragments >2mm

G - Permeability in inches per hour of the most restrictive layer.

in./hr.	class
less than 0.06	very slow
0.06 - 0.2	slow
0.2 - 0.6	moderately slow
0.6 - 0.2	moderate
2.0 - 6.0	moderately rapid
6.0 - 20.0	rapid
greater than 20.0	very rapid

H - Total Available Water Capacity (inches per inch). This is the ability of soil to hold water for use by most plants. It is the difference between the amount of soil water at field capacity and at wilting point.

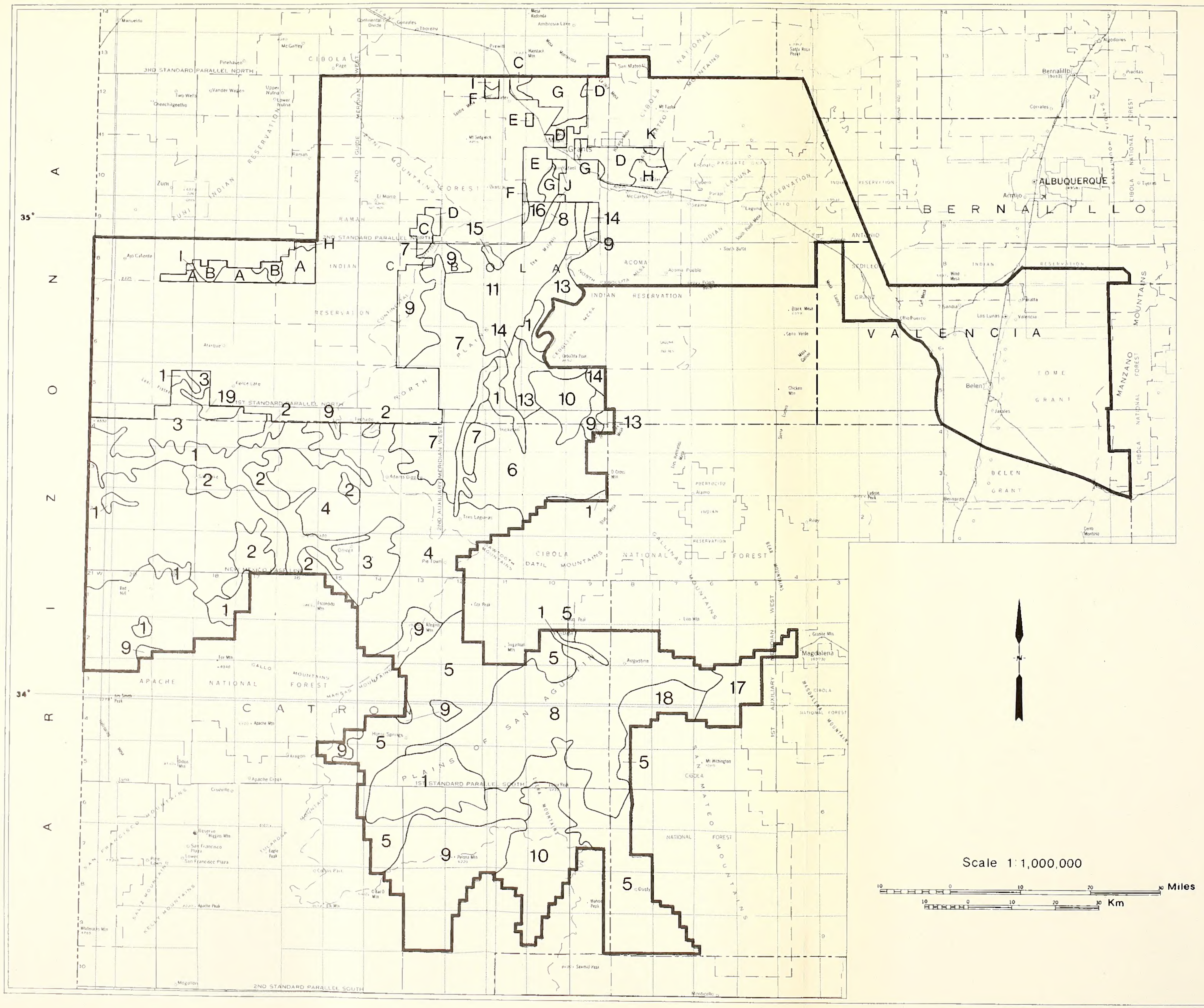
I - pH range (when available).

J - WEG - Wind Erodibility Group (see Appendix A).

K - Water Erosion Hazard (slight, mod. = moderate, or severe).

L - Present sediment yield class by allotment management category (see PSIAC methodology, Appendix A).

* = Data not available.
** = Soil mapping unit occurs in more than one general soil group. It is listed in the one in which it predominates.



U. S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
SOCORRO DISTRICT OFFICE
SAN AUGUSTINE RESOURCE AREA

WEST SOCORRO
RANGELAND MANAGEMENT PROGRAM
ENVIRONMENTAL IMPACT STATEMENT

MAP A-1. General Soils Map

Divide Planning Area Boundary

FOR LEGEND REFER TO ACCOMPANYING

TABLES A-1 AND A-2

Sources: SCS General Soils Maps for Valencia Co. 1972,
Socorro Co. 1966, Catron Co. 1981, and
BLM Socorro District Planning/EIS Files

Table A-2

PHYSICAL PARAMETERS OF SOILS
(By General Soil Mapping Unit)
See Map A-1 for Locations

A	B	C	D	E Soil Textures in Typical Pedon and Depth in Inches To Restrictive Layer			F	G	H
General Soil Mapping Unit	Major Mapping Unit Components	Percent of Unit	Percent Slope Range	Surface	Subsoil	Substratum	Permability of Most Restrictive Layer	pH Range	Wind Erodibility Group WEG
A. Litle - Clovis - Travesilla Association	Litle	30	0-20	SICL, CL	SIC, C	20-40" Sandstone	<0.06	7.4-8.4	4L
	Clovis	20	0-10	FSL, L	SCL, CL	20-40" Sandstone	0.6-2.0	6.6-8.4	3
	Travesilla	15	5-30	STSL, SL	STSL, SL	8-20" Sandstone	6.0-20.0	7.7-8.4	8
B. Ponil - Travesilla Association	Ponil	35	1-5	FSL	CL, C	Loamy Sediments	<0.06	6.1-8.4	3
	Travesilla	35	5-25	FSL, GRSL	FSL, STSL	4-20" Sandstone	6.0-20.0	7.4-8.4	3
C. Prieta - Rockland - Thunderbird Association	Prieta	30	0-10	STL, STCL	CBC, STC		<0.06	6.6-8.4	8
	Rockland	30	-						8
	Thunderbird	20	0-10	STCL, STL	CBC, STC, C		<0.06	6.6-8.4	8
D. Rockland - Thunderbird Association	Rockland	30	-						
	Thunderbird	30	0-10	STCL, STL	COBC, STC, COBCL	20-40" Basalt	0.06-0.2	6.6-8.4	8
E. Laporte - Rockland Association	Laporte	50	5-25	STL, COBL, L	STL, STSCL	8-20" Limestone	0.6-2.0	7.4-8.4	8
	Rockland	30	-						8
F. Osoridge - Jekley - Rockland Association	Osoridge	20	5-40	STFSL, STL	C	20-36" Shale and Sandstone	<0.06	5.6-6.5	8
	Jekley	20	3-40	SIL, STSIL, STL	SIL, SICL	20-30" Sandstone	0.06-0.2	5.6-7.3	8
	Rockland	20	-						8
G. Penistaja - Prewitt - Moriarty Association	Penistaja	35	1-9	FSL, VFSL	SCL, CL	SCL, SL	0.6-2.0	6.6-8.4	3
	Prewitt	25	0-2	L, SCL	SCL, CL	Loamy Alluvium	0.06-2.0	7.9-9.0	4L
	Moriarty	15	0-2	C, SICL	C, SICL	Clayey Alluvium	<0.06	7.9-8.4	4
H. Lohmiller - San Mateo Association	Lohmiller	35	0-3	CL, C, SICL		Clayey Alluvium	<0.06	7.4-9.0	6
	San Mateo	25	0-3	L, CL, SL		Loamy Alluvium	0.6-2.0	7.9-8.4	5
I. Rockland - Travesilla Association	Rockland	45	5-75+						
	Travesilla	30	5-30	FSL, STSL	FSL, STSL	4-20" Sandstone	6.0-20.0	7.4-8.4	3
J. Lava Rockland	Lava Rockland	*	-	RECENT LAVA FLOW					8
K. Cryoboroll - Cryoboralf Association	Cryoboroll	40	1-20	L, STL	C	GRCL	0.06-0.2	*	*
	Cryoboralf	30	15-75	L, STL	GRL, GRCL	VGRL, VGRSL	0.6-2.0	*	*
	Rockland	15	15-75						

This table represents the general soil mapping units for the 42,292 acres that were not recently inventoried.

Column: A - General Soil Mapping Unit Name

B - Soil Series within the Mapping Unit (does not include inclusions).

C - Percent composition of mapping unit that series occupies (does not total 100 percent because inclusions are not listed).

D - Percent slope range for each mapping unit component.

E - Most common textural range of surface, subsurface, and substratum (see Key to Table A-1, column E for texture abbreviations).

F - Permeability in inches per hour of the most restrictive layer.

in./hr.	class
less than 0.06	very slow
0.06 - 0.2	slow
0.2 - 0.6	moderately slow
0.6 - 2.0	moderate
2.0 - 6.0	moderately rapid
6.0 - 20.0	rapid
greater than 20.0	very rapid

G - pH range (when available).

H - Wind Erodibility Group (see Appendix A).

* = Data not available

Source: BLM Socorro District Planning/EIS Files.

PSIAC METHOD FOR CALCULATING SEDIMENT YIELD

The Pacific Southwestern Inter-Agency Committee's (1968) Method for determining soil loss was used in the water erosion portion of the Soil Section.

The following is the sediment yield classification:

Sediment Yield Classification	Rating	Sediment Yield Ac. ft./sq. mi./yr.
1 Severe	More than 100	More than 3.0
2 Critical	70-100	1.0-3.0
3 Moderate	50- 70	0.5-1.0
4 Slight	27- 50	0.2-0.5
5 Stable	Less than 27	Less than 0.2

Nine factors were evaluated for present and future sediment yield, and points were assigned to each factor by using the PSIAC nomographs. The points were totaled for each soil and placed in sediment yield classes. The following are the factors for evaluation use to determine these ratings.

Factors	PSIAC Factor Rating Minimum	PSIAC Factor Rating Maximum
A. - Surface Geology -	0	10
B. - Soils -	0	10
C. - Climate -	0	10
D. - Precipitation Intensity - (Runoff) -	0	10
E. - Topography -	0	20
F. - Cover -	-10	10

A. - Surface Geology -

Surface geology was evaluated as soil texture from a depth of 0 to 4 inches to determine this rating. Sandy soils received the lowest rating, 0, and soils with a high clay content received a high rating, 10.

B. - Soils -

This factor was rated the same as surface geology except the depth is 4 inches to effective rooting depth.

C. - Climate -

Climate was rated according to the value on the PSIAC nomograph for a 2-year, 6-hour, isopluvial storm in the NOAA Atlas 2.

D. - Precipitation Intensity - (Runoff) -

Precipitation intensity was rated the same as climate for the Existing Environment. Runoff was rated the same as the Affected Environment for the alternatives on the areas where there would be no vegetative land treatments because runoff predictions were not made in the Water Resources section. Runoff was rated one or two points lower for the areas which would have vegetative land treatments.

E. - Topography -

This factor was rated according to the percent slope. A soil with a 30-percent slope got the maximum number of points, 20, and a nearly level soil got the minimum factor rating, 0.

F. - Cover -

The amount of cover includes the percent cover from vegetation plus the percent coarse fragments on the soil surface. A soil with 100-percent cover would receive a rating of -10. A soil with 0-percent cover would receive a rating of 10. The cover rating changed for the alternatives based on the percent change in range condition class for areas that would not have vegetative land treatments. Cover predictions for areas that would have vegetative land treatments were based on the predictions from the Water Resources Section.

PSIAC METHOD FOR CALCULATING SEDIMENT YIELD (continued)

	Factors	PSIAC Factor Rating	
		Minimum	Maximum
G. -	Land Use -	-10	10
	A soil with 100-percent utilization would receive a rating of 10. A soil with 0-percent utilization would receive a rating of -10. The land use rating changed for the various alternatives.		
H. -	Upland Erosion -	0	25
	SSFs were used for rating the amount of upland erosion.		
I. -	Channel Erosion and Sediment Transport -	0	25
	The rating for this factor was determined by field observation for the amount of gullying. A soil with active headcuts and continuously eroding banks would recieve the maximum rating of 25.		

PSIAC factor points were totaled and assigned a sediment yield value from the sediment yield classification above. An example of factors affecting a high, medium, and low sediment yield and their associated PSIAC factor rating is presented in the Figure A-1.

FIGURE A-1

AN EXAMPLE OF FACTORS AFFECTING A HIGH, MODERATE, AND LOW SEDIMENT YIELD
IN THE PACIFIC SOUTHWEST

	A	B	C	D	E	F	G	H	I
Sediment Yield Levels	Surface Geology (Surface Texture ¼"-4")	Soils (Texture from 4" to ERD*)	Climate	Precipitation Intensity (Runoff)	Topography (Slope)	Cover (Vegetation and Coarse Fragments)	Land Use (Average % Utilization)	Upland Erosion (SSFs)	Channel Erosion and Sediment Transport
PSIAC Factor Rating	(10)	(10)	(10)	(10)	(20)	(10)	(10)	(25)	(25)
Maxium PSIAC Rating=130 High	Fine textured soils: easily dispersed Sandy clay, silty clay, clay	Fine texture soils: easily dispersed Sandy clay, silty clay, clay	2.0 value for a 2-year, 6-hour isopluvial	2.0 value for a 2-year, 6-hour isopluvial	Slopes greater than 30%	0% ground cover	100% Utilization	SSF=100	Eroding bank continuously or at frequent intervals with large depths and long flow duratio Active headcuts and degradation in tributary channels
PSIAC Factor Rating	(5)	(5)	(5)	(5)	(10)	(0)	(0)	(10)	(10)
Moderate	Medium textured soils Loam, silt loam, silt	Medium textured soils Loam, silt loam, silt	.9 value for 2-year, 6-hour isopluvial	.9 value for 2-year, 6-hour isopluvial	15% Slopes	50% ground cover	40% Utilization	SSF=34	Moderate flo depths, medium flow duration wit occasionally eroding bank or bed
PSIAC Factor Rating	(0)	(0)	(0)	(0)	(0)	(-10)	(-10)	(0)	(0)
Minimum PSIAC Rating=-20 Low	Coarse textured soils Sand, loamy sand	Coarse textured soils Sand, loamy sand	0 value for a 2-year, 6-hour isopluvial	0 value for a 2-year, 6-hour, isopluvial	Slopes less than 3%	100% ground cover	0% Utilization	SSF=0	Wide shallow channels wit flat gradients, short flow duratio Channels in massive rock large boulders, or well vegetated Artificially controlled channels

APPENDIX B

Water Resources

WATER QUALITY STANDARDS FOR INTERSTATE AND INTRASTATE STREAMS WITHIN THE DIVIDE PLANNING AREA

Rio Grande Basin

1) The main stem of the Rio Grande from the headwaters of Elephant Butte upstream to the Angostura Diversion Works, including any flow below the perennial reaches of the Rio Puerco and Jemez River which enters the main stem of the Rio Grande.

a) Designated Uses: irrigation, limited warmwater fishery, livestock and wildlife watering, and secondary contact recreation.

b) Standards:

i) In any single sample: dissolved oxygen shall be greater than 4.0 mg/l, pH shall be within the range of 6.0 to 9.0, and temperature shall be less than 32.2 C (90 F).

ii) The monthly logarithmic mean of fecal coliform bacteria shall be less than 1,000/100 ml, and no more than 10 percent of the samples shall exceed 2,000/100 ml.

iii) At mean monthly flows above 100 cfs, the monthly average concentration for: TDS shall be less than 1,500 mg/l, sulfate shall be less than 500 mg/l, and chloride shall be less than 250 mg/l.

2) The Jemez River and all its tributaries above the Town of Jemez Springs, perennial reaches of Vallecito Creek, the Guadalupe River and all its tributaries, and all perennial reaches of tributaries to the Rio Puerco except the Rio San Jose.

a) Designated Uses: domestic water supply, fish culture, high quality coldwater fishery, irrigation, livestock and wildlife watering, and secondary contact recreation.

b) Standards:

i) In any single sample: un-ionized ammonia (as N) shall not exceed 0.02 mg/l; conductivity shall be less than 400 umhos (700 umhos for perennial reaches of Vallecito Creek); dissolved oxygen shall be greater than 6.0 mg/l or 85 percent of saturation, whichever is greater; total inorganic nitrogen (as N) shall be less than 1.0 mg/l; pH shall be within the range of 6.6 to 8.8; temperature shall be less than 20 C (68 F); total chlorine residual shall be less than 0.002 mg/l; total organic carbon shall be less than 7 mg/l; total phosphorus shall be less than 0.1 mg/l; and turbidity shall be less than 25 FTU.

ii) The monthly logarithmic mean of fecal coliform bacteria shall be less than 100/100 ml, and no more than 10 percent of the samples shall exceed 200/100 ml.

3) All perennial reaches of the Rio San Jose in Valencia County from its confluence with the Rio Puerco upstream to Horace Springs.

a) Designated Uses: coldwater fishery, fish culture, irrigation, livestock and wildlife watering and secondary contact recreation.

b) Standards:

i) In any single sample: dissolved oxygen shall be greater than 6.0 mg/l, pH shall be within the range of 6.6 to 8.8, and temperature shall be less than 20 C (68 F).

ii) The monthly logarithmic mean of fecal coliform bacteria shall be less than 1,000/100 ml, and no more than 10 percent of the samples shall exceed 2,000/100 ml.

4) The main stem of the Rio Grande from Angostura Diversion Works upstream to Cochiti Dam.

a) Designated Uses: irrigation, livestock and wildlife watering, secondary contact recreation, coldwater fishery, and warmwater fishery.

b) Standards:

i) In any single sample: dissolved oxygen shall be greater than 6.0 mg/l, pH shall be within the range of 6.6 to 9.0, and temperature shall be less than 25 C (77 F).

ii) The monthly logarithmic mean of fecal coliform bacteria shall be less than 1,000/100 ml, and no more than 10 percent of the samples shall exceed 2,000/100 ml.

Gila River Basin

1) The main stem of the Gila River from the New Mexico-Arizona line upstream to Red Rock.

a) Designated Uses: irrigation, limited warmwater fishery, livestock and wildlife watering, and secondary contact recreation.

b) Standards:

i) In any single sample: dissolved oxygen shall be greater than 5.0 mg/l, pH shall be within the range of 6.6 to 8.8, and temperature shall be less than 32.2 C (90 F).

ii) The monthly logarithmic mean of fecal coliform bacteria shall be less than 1,000/100 ml, and no more than 10 percent of the samples shall exceed 2,000/100 ml.

2) The main stem of the Gila River from Red Rock upstream to Gila Hot Springs.

a) Designated Uses: industrial water supply, irrigation, livestock and wildlife watering, marginal coldwater fishery, secondary contact recreation, and warmwater fishery.

b) Standards:

i) In any single sample: dissolved oxygen shall be greater than 5.0 mg/l, pH shall be within the range of 6.6 to 8.8, and temperature shall be less than 28 C (82.4 F).

ii) The monthly logarithmic mean of fecal coliform bacteria shall be less than 1,000/100 ml, and no more than 10 percent of the samples shall exceed 2,000/100 ml.

3) The main stem of the Gila River from Gila Hot Springs upstream to the headwaters and all tributaries thereto and all other perennial tributaries to the Gila River above the Town of Cliff.

a) Designated Uses: domestic water supply, high quality coldwater fishery, irrigation, livestock and wildlife watering, and secondary contact recreation.

b) Standards:

i) In any single sample: un-ionized ammonia (as N) shall not exceed 0.02 mg/l; conductivity shall be less than 300 umhos for the main stem of the Gila River above Gila Hot Springs and 400 umhos for other reaches; dissolved oxygen shall be greater than 6.0 mg/l or 85 percent of saturation, whichever is greater; total inorganic nitrogen (as N) shall be less than 1.0 mg/l; pH shall be within the range of 6.6 to 8.8; temperature shall be less than 20 C (68 F) except in the East Fork of the Gila River and Sapillo Creek below Lake Roberts where the temperature shall be less than 32.2 C (90 F); total chlorine residual shall be less than 0.002 mg/l; total phosphorus shall be less than 0.1 mg/l; total organic carbon shall be less than 7 mg/l; and turbidity shall be less than 10 FTU.

ii) The monthly logarithmic mean of fecal coliform bacteria shall be less than 100/100 ml, and no more than 10 percent of the samples shall exceed 200/100 ml.

Source: Water Quality Control Commission 1981

APPENDIX C

Vegetation

Methodology

In the mapping process, range sites were determined by comparing topographic, elevational, and soil characteristics of a given site to the SCS Range Site Descriptions. In sites such as "savannah," vegetation features were also used. The ecological condition of areas within a range site was estimated by comparing the present plant community with the climax plant community indicated in the Range Site Description.

Four classes are used to express the degree to which the composition of the present plant community reflects that of the climax community (SCS 1976). The four classes are:

Rangeland Condition Class	Percentage of Present Plant Community that is Climax for the Range Site
Excellent	76 - 100
Good	51 - 75
Fair	26 - 50
Poor	0 - 25

Percent composition by air dry weight of each species of the existing plant community cannot exceed the percent composition of the same species which count as climax, as shown on the guide for the climax plant community. The amount of all climax species not in excess of that shown on the guide is totalled to indicate the relative ecological rating. This rating will be between 0 and 100. An example of the calculations for a loamy range site occurring in the Western Plateau MLRA is shown below.

Plant	Maximum Percent Composition	Present Percent Composition	Adjusted Percent Composition
Blue grama	25	20	20
Sand dropseed	5	5	5
Broom snakeweed	3	70	3
Winterfat	5	5	5
			33

Total adjusted rating was 33 which indicates a fair ecological condition rating. Most of the production by species in this example is taken up by broom snakeweed, leaving low percentages of other climax species to be counted toward the ecological condition rating. (See potential plant community guide for loamy range site-Western Plateau in this Appendix.)

No adjustments were made for total weight of forage produced compared with the potential; therefore, the condition class ratings used are not based upon the variations in total production for any specific site and only reflect plant species compositions.

SPECIES OCCURRENCE BY RANGE SITE AND CONDITION CLASSES

Range Sites/Condition Classes

Scientific Name	Common Name	Loamy Plains WP E G F P	Shallow Hills WP E G F P	Sandy Slopes WP E G F P	Flood Plain WP E G F P	Meadow WP E G F P	Basalt Hills WP E G F P	Malpais WP E G F P	Loamy WP E G F P	Sandy WP E G F P	'Gravelly WP E G F P	Deep Sand WP E G F P	Shallow WP E G F P	Cinder WP E G F P
GRASSES														
Agropyron smithii	western wheatgrass	Ø	Ø	Ø	Ø 0 0	Ø 0 X	0 X X	0 X	Ø 0 0 0	Ø 0 0 0	0	0 X	0 X	0
Andropogon barbinodis 1/	cane bluestem						0	X						
Andropogon gerardi	big bluestem						X X			X			X	
Andropogon saccharoides 2/	silver bluestem										0 X		0 X	
Andropogon scoparius 3/	little bluestem		X	X	X		0 X X	X X					X 0	
Aristida arizonica	Arizona threeawn						X X	X			X 0 0 X	X	X	X 0 0 X
Aristida divaricata	poverty threeawn						X X	X X	X 0 Ø Ø	X Ø X	X 0 Ø X	X 0 Ø X	X 0 Ø X	X Ø Ø X
Aristida fenderiana	Fendler threeawn	X	X X	X X	X		X Ø Ø X	X Ø Ø X	X 0 Ø Ø	X 0 Ø X	X 0 Ø X	X	X X	
Aristida longiseta	red threeawn	X					X X	X X	X X	X	X 0 0 X	X	X X	
Aristida purpurea	purple threeawn								X X X					
Blepharoneuron tricholepis	pine dropseed						X X	X X			X		X	
Bouteloua curtipendula	sideoats grama		X				Ø 0 0	Ø 0 X	X X		X 0	X	0 0	0 X
Bouteloua eriopoda	black grama		X	X			Ø 0 0	X X X	X X 0 X	X	0 0 X	X	X	X X
Bouteloua gracilis	blue grama	Ø 0	0 0	Ø 0	0 0 0 0	X	0 0 0	Ø Ø Ø X	Ø Ø Ø 0	Ø Ø Ø 0	Ø Ø Ø X	Ø Ø 0 0	Ø Ø 0	Ø Ø Ø X
Bouteloua hirsuta	hairy grama						X X	X		0	X X		X	X
Bouteloua simplex	mat grama									X				
Bromus spp.	annual bromes	X	X	X	X									
Bromus spp.	perennial bromes						X X	X	X					
Carex spp.	sedges				X	Ø Ø Ø Ø	X X		X	X				X
Distichlis stricta	inland saltgrass					0			X	0				
Elymus canadensis	Canada wildrye					0			X					
Eragrostis spp.	lovegrasses					X	X							
Festuca arizonica	Arizona fescue						X X	X					X	
Festuca octoflora	sixweeks fescue	X												
Hilaria jamesii	galleta	0 0	X 0	0 0	0 0 X X		X Ø Ø X	X Ø Ø X	0 0 X	X 0 0 X	X 0	X X	X 0 0	0 0
Hordeum jubatum	foxtail barley				X	0 X X								
Juncus spp.	rushes					Ø Ø Ø Ø								
Koeleria cristata	Junegrass		X				X X	X X			X X		X	X
Lycurus phleoides	wolftail	X	X X				X X	X X	X X X	X X	0 X		0 0 X	0 X
Muhlenbergia dubia	pine muhly							X						
Muhlenbergia montana	mountain muhly						0 X	X			X		0	X
Muhlenbergia mundula	mundula muhly													
Muhlenbergia pauciflora	New Mexico muhly						X						X	
Muhlenbergia pungens	sandhill muhly			X	X X					X 0 Ø Ø	X	X X Ø Ø		
Muhlenbergia richardsonis	mat muhly	0			0 X 0	0	X	X	X 0 0 0	X				
Muhlenbergia torreyi	ring muhly	X	X	X	X X X		X X	X 0	X 0 Ø Ø	X 0 Ø Ø	X 0 Ø Ø	X X Ø Ø	X 0 Ø Ø	X 0 Ø Ø
Muhlenbergia wrightii	spike muhly	X			0 X		X X	0 X X	0 X X X	X X X	0 X		0 X	0 X
Munroa squarrosa	false buffalograss								X X	X X X				
Oryzopsis hymenoides	Indian ricegrass	0 X	0	Ø X	X X		X X	X	X X X	0 0 X	0 X	Ø X	0 X	0 X
Oryzopsis micrantha	littleseed ricegrass						X	X	X		X	0		
Panicum obtusum	vine-mesquite				X		X X X		X					
Piptochaetium fimbriatum	pinyon ricegrass						X X							X
Poa bigelovii	Bigelow bluegrass						X		X		X		X	
Poa fendleriana	muttongrass		0		0	0	X X	X X	X	X				X
Poa pratensis	Kentucky bluegrass					0 0 0 0								
Scleropogon brevifolius	burrograss								X		X			
Schedonnardus paniculatus	tumblegrass			X	X				X					
Sitanion hystrix	bottlebrush squirreltail	0 X	X	0 X	X 0 0 X	X	0 0 0	X 0 0	0 0 0 0	0 0 0 X	0 0 0	0 X X	0 X X	0 0 X
Sporobolus airoides	alkali sacaton	0 0	X	0 X	Ø 0 0 X	X	0	X X X	0 X 0	0 0 X	X	X 0	X	X
Sporobolus contractus	spike dropseed	X		0			X		X	0 0 0 X		0 0 0 X		
Sporobolus cryptandrus	sand dropseed	X	X X	0 X	X X		X 0	0 0	X 0 Ø Ø	0 0 0 0	X X X	0 0 0 X	X X	X X
Sporobolus flexuosus	mesa dropseed			0				X				0 0		
Stipa comata	needle and thread	X	X	0			0 X	0 X	0 X	X X	0 0	0	Ø 0	0 X
Stipa lettermani	Letterman needlegrass						X X X			X			X	
Stipa neomexicana	New Mexico feathergrass	X	0	0 0			0 X	0 0 X	0	0 X	0 0	0 0	Ø X	0 X
Stipa tenuissima	finestem needlegrass						X							
WOODY PLANTS														
Artemisia bigelovii	Bigelow sagebrush	X X	0	0 0	X		X X	X X	0	0	X 0		X X	X
Artemisia filifolia	sand sagebrush			0				X	X	X 0		Ø		
Artemisia frigida	fringed sagewort		0	0	X X		X X	X 0	0 X 0 X	X 0	X	X	X	X
Atriplex canescens	four-wing saltbush	0 X	0 X	0 X	0 0 0 0		X 0	0 0	Ø 0 0 0	Ø 0 0 0	X X 0	0 0 0 0		0 X 0
Brickellia brachyphylla	brickellbush						X	X					X	
Brickellia californica	California brickellbush						X							
Cercocarpus montanus	mountain mahogany		0	X			X X X				X		X	
Chrysothamnus depressus	dwarf rabbitbrush							X		X				
Chrysothamnus nauseosus	rubber rabbitbrush	0 0 0 0	0 0 0 0	X X 0 0	X 0 0 X	X	X 0	X 0 0	X 0 Ø Ø	X 0 Ø Ø	X 0 Ø Ø	X X 0 0	X Ø Ø	X 0 Ø Ø
Cowania mexicana	Mexican cliffrose		0	0							X			
Eriogonum leptophyllum	slender-leaf eriogonum			X						X				

Scientific Name	Common Name	Bottomland WP E G F P	Clayey Bottomland WP E G F P	Swale WP E G F P	Shallow Sandstone WP E G F P	Sandstone Hills WP E G F P	Limestone Hills WP E G F P	Hills WP E G F P	Salt Flats WP E G F P	Savannah WP E G F P
GRASSES										
Agropyron smithii	western wheatgrass	Ø 0 0 X	Ø 0 0	Ø 0 X 0	X X	0 0 X	0 X	0 X X	0	Ø X X
Andropogon barbinodis 1/	cane bluestem			0		X		X		
Andropogon gerardi	big bluestem					X		X X X		X
Andropogon saccharoides 2/	silver bluestem			0 X	0	X 0		X X		
Andropogon scoparius 3/	little bluestem			X X X		Ø X	0	0 0 0 X		X
Aristida arizonica	Arizona threeawn	X 0	X X	X 0 Ø X	X X X	X X X X		X X X		X X X
Aristida divaricata	poverty threeawn	X	X X	X 0 Ø X	X X X	X Ø Ø X	X Ø Ø X	X Ø Ø X	X X	X Ø Ø X
Aristida fenderiana	Fendler threeawn			X X	X X	Ø Ø	X Ø Ø X	X Ø Ø X	X	X Ø Ø X
Aristida longiseta	red threeawn			X X	X X	X X		X X X		X X
Aristida purpurea	purple threeawn					X X				
Blepharoneuron tricholepis	pine dropseed			X		0 X		0 0 X		0 X X
Bouteloua curtipendula	sideoats grama			0 0	Ø X X	Ø X 0	0 X	Ø 0 0 0		X X
Bouteloua eriopoda	black grama			X	X X	X X 0	Ø X	X 0 0 0		X 0 0
Bouteloua gracilis	blue grama	0 Ø Ø 0	0 Ø Ø X	0 Ø Ø Ø	Ø 0 0	Ø 0 0	Ø 0 0	Ø 0 0 0	0 0 X	Ø Ø Ø X
Bouteloua hirsuta	hairy grama			X	X X	X Ø Ø X		0 X		X
Bouteloua simplex	mat grama			X					X	
Bromus spp.	annual bromes									
Bromus spp.	perennial bromes		X			X		X X		X
Carex spp.	sedges	X X		X	X	X		X X		X
Distichlis stricta	inland saltgrass	X 0	X	X					0 X	
Elymus canadensis	Canada wildrye	X								
Eragrostis spp.	lovegrasses									
Festuca arizonica	Arizona fescue					0 X X		0 X X		
Festuca octoflora	sixweeks fescue				X					
Hilaria jamesii	galleta	0 0 X	0 0	0 0	X 0 0	X 0 0	X Ø Ø X	X Ø Ø X	0	0 0 0
Hordeum jubatum	foxtail barley									
Juncus spp.	rushes									
Koeleria cristata	Junegrass			X	X	0 X X	0 X	X 0 X X		0 X X
Lycurus phleoides	wolftail	X X	X	0 X 0 0	X X X	X X X	0 X	X 0 0 0		X X X
Muhlenbergia dubia	pine muhly			X				X X		X
Muhlenbergia montana	mountain muhly			X	X	0 X X	0 X	0 0 0 X		X X
Muhlenbergia mundula	mundula muhly									
Muhlenbergia pauciflora	New Mexico muhly				X X	X X		X X		
Muhlenbergia pungens	sandhill muhly				X 0 0 0	X		X	X	
Muhlenbergia richardsonis	mat muhly	X 0 Ø Ø	X X X	X 0 X X		X X		X	0 X 0	X X
Muhlenbergia torreyi	ring muhly	X 0 Ø Ø	X X	X 0 Ø Ø	X X	X X		X X X	X X	X Ø Ø Ø
Muhlenbergia wrightii	spike muhly	0 X X	0	0 0 0 X	X	X	0	X 0 X X	0 0	X
Munroa squarrosa	false buffalograss			X X X						X X
Oryzopsis hymenoides	Indian ricegrass	X	X	X	0 X X	0 X X	X	X X		Ø X X
Oryzopsis micrantha	littleseed ricegrass					X		X		X
Panicum obtusum	vine-mesquite	X X	0	0 X X		X		X	0	
Piptochaetium fimbriatum	pinyon ricegrass					X	0	X X		X X
Poa bigelovii	Bigelow bluegrass	X		X						X
Poa fendleriana	muttongrass				0 X X	0 X		0 X X		X X
Poa pratensis	Kentucky bluegrass							X		
Scleropogon brevifolius	burrograss									
Schedonnardus paniculatus	tumblegrass									
Sitanion hystrix	bottlebrush squirreltail	X 0 0 X	X 0 0	X 0 0 X	0 0 X	0 0 X	X	X 0 0 X	X X	0 0 0
Sporobolus airoides	alkali sacaton	Ø 0 X X	0 0 0	Ø X X	X 0 0	X 0 0			Ø 0 0 0	X X
Sporobolus contractus	spike dropseed	X			X	X		X X 0 0	0	0 0 X
Sporobolus cryptandrus	sand dropseed	X 0 X 0	X	X X X 0	X X X	X X 0		X X 0 0	0	Ø 0 X
Sporobolus flexuosus	mesa dropseed	X								X
Stipa comata	needle and thread			X	0 X	0 X		0 X X		0 X
Stipa lettermani	Letterman needlegrass				0 0 X	X X	0	X		X
Stipa neomexicana	New Mexico feathergrass			X	0 0 X	0 X X	Ø 0	0 X X		0 X X
Stipa tenuissima	finestem needlegrass									
WOODY PLANTS										
Artemisia bigelovii	Bigelow sagebrush	X X	0	0 X	0 0 X	0 0 0		X X		X X
Artemisia filifolia	sand sagebrush		X		0	X X				0 0
Artemisia frigida	fringed sagewort	X X 0 X	X 0	X X X	X	X X	X	X X		X X
Atriplex canescens	four-wing saltbush	Ø 0 0 X	Ø 0 0	Ø 0 0 0	0 X X	0 0	X	X X X	Ø 0 0 0	0 X X
Brickellia brachyphylla	brickellbush				X	X X		X		
Brickellia californica	California brickellbush							X X		
Cercocarpus montanus	mountain mahogany				0 0 0	0 0 X	0 X	0 0 X		X
Chrysothamnus depressus	dwarf rabbitbrush					X X				X
Chrysothamnus nauseosus	rubber rabbitbrush	0 0 Ø Ø	0 0 Ø Ø	0 0 Ø Ø	0 0 0 0	X Ø Ø Ø		0 0 X	0 0 0 0	0 0 0
Cowania mexicana	Mexican cliffrose					X		0		
Eriogonum leptophyllum	slender-leaf eriogonum					X		X		

Scientific Name	Common Name	Pine Grassland AN E G F P	Mountain Malpais AN E G F P	Stony Loam AN E G F P	Mountain Upland AN E G F P	Shallow Hills AN E G F P	Mountain Breaks AN E G F P	Mountain Swale AN E G F P	Shallow Savannah AN E G F P	Basalt Hills AN E G F P	Rocky-Mountain Malpais AN E G F P	Rocky-Mountain Loam AN E G F P
GRASSES												
Agropyron smithii	western wheatgrass	X	X X	0	0	X	X	Ø 0 0	X		0 X	0 X
Andropogon barbinodis 1/	cane bluestem							X				
Andropogon gerardi	big bluestem		0 X X	X X X	X X X	X	X	X	X	X X X	X	X X
Andropogon saccharoides 2/	silver bluestem							X	X			
Andropogon scoparius 3/	little bluestem	X	0 X	X X X	X X X	0	X	X	0 0	X X X	0 0	X 0
Aristida arizonica	Arizona threeawn	X	X X X	X X X	X X	X	X	X X	X X	X X X	0 X	X X X
Aristida divaricata	poverty threeawn		X X	X 0	X X X	X		X X	X	0 X	X X	X 0
Aristida fenderiana	Fendler threeawn			X	X X	X		X X	X	X X X	0 X X	X
Aristida longiseta	red threeawn			X	X				X	X X	X	X
Aristida purpurea	purple threeawn											
Blepharoneuron tricholepis	pine dropseed	X	X X X	X X 0	X X X		X	X X	0 0	0 0 X	0 0 X	X X
Bouteloua curtipendula	sideoats grama	X	0 X	X	0 X 0	0	X X	X	0 X	0 0 X	0 X X	X X
Bouteloua eriopoda	black grama									X X	X X	
Bouteloua gracilis	blue grama	0 Ø Ø X	X Ø Ø X	0 Ø Ø X	0 Ø Ø X	0	Ø 0 0	0 Ø Ø Ø	0 Ø Ø X	0 0 0	0 0 0 X	Ø 0 0 X
Bouteloua hirsuta	hairy grama				0				X X	X	0 X	X
Bouteloua simplex	mat grama							X			X	
Bromus spp.	annual bromes											
Bromus spp.	perennial bromes	X	X		X X X		X	X X	X	X X	X	X X
Carex spp.	sedges			X	X X		X	X	X	X	X X	X
Distichlis stricta	inland saltgrass											
Elymus canadensis	Canada wildrye											
Eragrostis spp.	lovegrasses						X					
Festuca arizonica	Arizona fescue	Ø	Ø X	Ø X X	Ø 0	Ø	0 X	X 0	0 X	Ø 0 X	Ø	0 X
Festuca octoflora	sixweeks fescue											
Hilaria jamesii	galleta										X 0	X
Hordeum jubatum	foxtail barley										X	
Juncus spp.	rushes											
Koeleria cristata	Junegrass	0	0 X X	0 X X	X X X	X	Ø X	X X	X 0	0 0 0	0 0 X	0 X X
Lycurus phleoides	wolftail	X	X X X	X X 0	X X X	X	X	X 0 0	X 0	0 X	X X	0 X X
Muhlenbergia dubia	pine muhly	X	X	X X	X 0	X		X	X X	X X		X
Muhlenbergia montana	mountain muhly	Ø	Ø 0 X	0 0 0	0 0 0	0	0	0 X	Ø 0	0 0 0	Ø 0 0	0 0 0
Muhlenbergia mundula	mundula muhly							0				
Muhlenbergia pauciflora	New Mexico muhly	Ø	Ø	0	0			X	Ø X	X X		
Muhlenbergia pungens	sandhill muhly											X
Muhlenbergia richardsonis	mat muhly							X X 0 0		X	X X	X
Muhlenbergia torreyi	ring muhly		X	X				X	X	X X	X X	X
Muhlenbergia wrightii	spike muhly		X X X	X X X	0	X	X	0 X 0	X X	X X	0 X X	0 X X
Munroa squarrosa	false buffalograss							X X	X			
Oryzopsis hymenoides	Indian ricegrass				X X						X X	X
Oryzopsis micrantha	littleseed ricegrass				X							X
Panicum obtusum	vine-mesquite										X X	
Piptochaetium fimbriatum	pinyon ricegrass	X			X		X		0		X	
Poa bigelovii	Bigelow bluegrass				0 X			X				X
Poa fendleriana	muttongrass	0	0 X	0 X	Ø 0 X	Ø	Ø X	X X	0 X	0 0	Ø X	0 X
Poa pratensis	Kentucky bluegrass	X			X			X				X
Scleropogon brevifolius	burrograss											
Schedonnardus paniculatus	tumblegrass										X	
Sitanion hystrix	bottlebrush squirreltail	X	X X X	0 X 0	0 X X	X	X X X	X 0 0 X	X 0	X 0 0	0 0 X	X 0 X
Sporobolus airoides	alkali sacaton										X X	
Sporobolus contractus	spike dropseed							X			X	
Sporobolus cryptandrus	sand dropseed						X X				X X 0	
Sporobolus flexuosus	mesa dropseed		X	X	X							
Stipa comata	needle and thread				X					X		
Stipa lettermani	Letterman needlegrass		X	X	X		0	X	X			X
Stipa neomexicana	New Mexico feathergrass				X			X		X X	X	
Stipa tenuissima	finestem needlegrass		X		X					X		
WOODY PLANTS												
Artemisia bigelovii	Bigelow sagebrush									X	X X	0
Artemisia filifolia	sand sagebrush											
Artemisia frigida	fringed sagewort	X	X X 0	X 0	0	0	X X	0 X 0 0	X X	X X	X 0	X
Atriplex canescens	four-wing saltbush		X	X						X	X 0	X
Brickellia brachyphylla	brickellbush				X			X			X X	
Brickellia californica	California brickellbush									X	X	
Cercocarpus montanus	mountain mahogany				0 X X		0		0 X		X	X
Chrysothamnus depressus	dwarf rabbitbrush				X					X	X	X
Chrysothamnus nauseosus	rubber rabbitbrush		0 X	X 0 0 0	0 Ø Ø Ø		X	0 0 X	X	X X	0 0 0 0	0 0 0 0
Cowania mexicana	Mexican cliffrose											
Eriogonum leptophyllum	slender-leaf eriogonum											

SPECIES OCCURRENCE BY RANGE SITE AND CONDITION CLASSES

Scientific Name	Common Name	Loamy Plains WP E G F P	Shallow Hills WP E G F P	Sandy Slopes WP E G F P	Flood Plain WP E G F P	Meadow WP E G F P	Basalt Hills WP E G F P	Malpais WP E G F P	Loamy WP E G F P	Sandy WP E G F P	Gravelly WP E G F P	Deep Sand WP E G F P	Shallow WP E G F P	Cinder WP E G F P	Bottomland WP E G F P	Clayey Bottomland WP E G F P	Swale WP E G F P	Shallow Sandstone WP E G F P	Sandstone Hills WP E G F P	Limestone Hills WP E G F P	Hills WP E G F P	Salt Flats WP E G F P	Savannah WP E G F P	Pine Grassland AN E G F P	Mountain Malpais AN E G F P	Stony Loam AN E G F P	Mountain Upland AN E G F P	Shallow Hills AN E G F P	Mountain Breaks AN E G F P	Mountain Swale AN E G F P	Shallow Savannah AN E G F P	Basalt Hills AN E G F P	Rocky-Mountain Malpais AN E G F P	Rocky-Mountain Loam AN E G F P
WOODY PLANTS (continued)																																		
Eriogonum wrightii	Wright eriogonum						0 0 X	0 X									X	X	X X		X X					X				X	X	X 0 X		
Eurotia lanata 4/	winterfat	0 X	X	0	X 0 0		0 0 X	X 0 0	0 0 0 0	0 0 0 X	0 0 0	X X	0 X	X 0 X	0 0 X	0 X X	0 0 0 X	0 X 0	0 X X	0 X 0	X X X 0		X X X		0 X	X	X	X	X	X		X	0	X X
Fallugia paradoxa	Apache-plume						0 X X	X X X X	X X	X	X 0 X			0	0 X		0 0 0	0	X		X X 0 0		X X		0 X 0	X X X	X X X		X	0 0 0	X X	X X X	0 X X	
Gutierrezia sarothrae 5/	broom snakeweed	0 0 0 0	X X 0 0	X X 0 0	X 0 0 X		X 0	X 0 0 0	X 0 0 0	X 0 0 0	X 0 0 0	X 0 0 0	X 0 0 0	X 0 0	0 0 0 0	0 0 0 0	0 0 0 0	X 0 0 0	X 0 0 0	X 0 0 0	X 0 0 0	0 0 0 0	X 0 0 0		X X 0 0	X 0 0 0	X X 0 0	X	X	X 0 0 0	X	X X	0 0	0 0 0 0
Holodiscus dumosus	rockspirea																										0		X		X			
Juniperus deppeana	alligator juniper						X X	X					X X	X			X				0 X X X		X 0	X	0 X X	X	X X X		X X	X	0 X	X X	X X	X X
Juniperus monosperma	oneseed juniper	X 0 0	0 0 0 0	0 0 0 0	X X X		0 0 0 0	X 0 0 X	X X 0 0	X 0 0	X 0 0	X X X	0 0 0	X 0 0 X	X X		X 0 X	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0		0 0 0 0	X	0	X X	X X	X	0 0 0	X X	0	X X X	0 0 X	0 0
Juniperus scopulorum	Rocky Mountain juniper						X X				X			X			X		X				X	X	0				X	X	X	X		X X
Lotus wrightii	Wright deervetch						X							X																				
Lycium pallidum	pale wolfberry	0 X	X		0 X		0 X X	0 X 0	X X X	X X	X X		X X	0 X 0	X X		0 X X X	X X	X X	X	0 X X	X 0 X	X X 0			X	0				X	X X	X X	X
Menodora scabra	rough menodora						X														X													
Opuntia spp.	pricklypear		X X 0 0	0 0	X X		X X	0 X	X X X X	X X	X X		X X	X	X X		X X X	X X	X X	X	X X X		X X X		X X	X X	X X X		X	X X	X	X X	X X	X X
Phoradendron juniperinum	mistletoe																		X		X													
Pinus edulis	pinyon		0 0 0 0	0 0 0 0			0 0 0 0	X 0 0	X 0 0	X 0 0	X 0 0	X X	0 0 0	X 0 0 X	X X		X 0 X	0 0 0 0	0 0 0 0	0 0 X	0 0 0 0		0 0 0 0		0	X X 0	0 0 0		0 0 0	X 0	0 0	X 0 X	0 0 X	0 0 X
Pinus ponderosa	ponderosa pine						X		X		X		0	X	X X		X X	X X	X	X	0 0 X		X X	0	0	X X	X 0 0		X 0 X	X X	X 0	X X	0 0 X	0 0 0
Quercus spp.	oaks		X				0 0 0 0	0 X X	X		X		X 0		0		0 X	0 0	0 0 0	0 0	0 0 0 X		0	X	0	X 0	X X 0	X	0 X	0 X	0 0	0 0 X	0 0 X	0 0 X
Rhus trilobata	skunkbush sumac		0 X				0 X 0	X X X					X X	X			X	X 0	0 X X	0 X	0 X X X		X	X	0 X X	0 X X	X	0	0 X	0 X X	0 X	X 0 X	X X	
Ribes spp.	currant						X X	X									X		X		X X X		X		0	X X	X X		0 0 X	0 X	X	X X	0 X X	0
Sarcobatus vermiculatus	black greasewood															X 0						0 0 0												
Tamarix pentandra	salt cedar				X	0 0 0 0									X		X																	
Tetradymia canescens	gray horsebrush	0 0 0 0		X X 0 0			X 0	X 0	X 0 0 0	X 0 X	X X 0	X		X X	X X		X	X	X X X		X X		0 X X										X X	X
Yucca baccata	Datil yucca		X	X			X X	X X	X	0			X		X			X X	X		X X		X X				X 0 X			X			X X	X
Yucca glauca	soapweed yucca			X X 0 0	X		X		X X X X	X X X	X X	0	X	X	X X		X X	X X	0 X		X X X		X X										X	X
FORBS																																		
Achillea millefolium lanulosa	western yarrow		X			X X X X																					X X X			X				
Allium cernuum	onion			X																							X							
Amaranthus spp.	pigweed								X																									
Artemisia carruthii	Carruth's sagewort			X	X		X X	0 0	X X X	X	X		X	X		X X	X		0 X		0 X X		0 X		X X	X X 0	0 0 X			X 0	X	X 0 0	0 X	X
Artemisia dracunculoides	false tarragon			X	X		X X	X X X	0 0 0	0 0 0	X X	X	X		X 0 0		0 0 0	X X	X X		0 0 X		X X	X	X	X X	X 0 0	X		X 0	X 0	X X	0 X X	X X
Artemisis ludoviciana	Louisiana sagewort			X			X X				X		X		X				X X	0	X X X		X			X	X X				X	X	X X	X X
Arabis fendeleri								X	X										X		X												X	X
Astragalus lentigenosus	specklepod loco						X		X 0 0 0	X				X							X X					X						X		
Astragalus mollissimus	wooly loco						X X	X	X 0 0 0	X	X					X			X		X X X		X X		X	X X				X	X	X		X X
Astragalus spp.	locoweed	X		X X	X		X X	X X	X X		X		X			X		X	X X		X X		X X			X	X X			X X		X X		X
Bahia dissecta							X X		X	X									X		X X		X			X	X			X		X		
Bahia woodhousei																	0																	
Brickellia grandiflora	tasselflower brickellbush						X																								X			
Castilleja integra	wholeleaf paintbrush	X	X	X			0 X	X X											X						X	X X X	X	X	X	X				
Chenopodium spp.	goosefoot			X X 0 0	X X		X X	X X	X 0 X	X X	X		X		X X	X	X X 0	X X	X X		X X 0	X X X	X X	X	X	X	X X X			X 0	X X	X X	X X	X X
Cirsium ochrocentrum	yellowspine thistle				X		X X	X X	X X X	X			X	X	X X		X X		X		X X X		X X		X	X X	X			X X X		X X	X	X X
Cirsium undulatum	wavyleaf thistle									X																				X		X		
Cleome serrulata	Rocky Mountain beeplant	X X 0 0		X X 0 0					X 0 0 0	X 0 0 0					X		X X	X X	X X		X		X							X X				
Cryptantha fendleri		X			X X		X X	X X	X X X	X X X	X	X X	X		X X		X 0 X	X X	X X		X X X		0 X			X	X X			X X	X	X X	X X	X X
Cryptantha jamesii				X			X	X X	X X X	X X X	X				X		X X	X X	X X	X	X X X		X X X		X	X	X X			X X	X	X	X	X X
Cucurbita foetidissima	buffalo gourd														0																			
Descurainea spp.	tansymustard	X X 0 0			X X 0 0		X X	X X	X X X	X X X	X	X 0 X									X X X		X X			X	X X					X		X X
Dithyrea wizlizeni	spectaclepod								X X X	X X X	X	X 0 X									X X X		X											X
Erigeron divergens								X															X											
Erigeron nudiflorus							X X	X X			X		X		X		X		X		X 0 X		X		X X	0 X	X X 0			X X	X	X X	X	X X
Erigonum alatum							X		X												X X									X	X	X X		
Eriogonum annuum							X		X X X	X 0					X X		X						X				X					X	X	
Eriogonum cernuum					X				X X	X X	X	X				X	X			X X			X											
Eriogonum hieracifolium				X			X X	X	X	X		X	X	X	X	X		X X	X		X X					X X				X		X		
Eriogonum jamesii				X			X X	X X	X X X	X 0 X	X X		X	X			X X	X X	X X		X X X		X X		X 0	X 0	X X			0 X	X	0 0	X X	X
Eupatorium herbaceum																	X		X								X X			X	X	X		
Euphorbia spp.	spurge			X			X X		X	X	X X				X	X X	X	X	X		X X		X			X				X X	X			X X
Evolvulus spp.													X																					
Franseria acanthicarpa	annual bursage								X	0 X X							X						X											
Geranium spp.	geranium						X							X			X										X X			X X	X	X		X
Gilia aggregata	skyrocket gilia		X	X																										X				
Gilia longiflora										X X		X																						
Gilia multiflora							X				X								X		X X X		X				X					X		X
Grindelia spp.	gumweed				X				0 0	X					0 X	X	X									X				X	X			X
Haplopappus gracilis					X		X X	X X	X X 0	X X X	0	X X			X		X X	0 X	X		X X	X	X X				X X			X	X	X	X	X
Haplopappus spinulosus	ironplant goldenweed			X				X X	X X 0	0 0 X		X			X		X X			X	X 0		X X			X					X	X X	X	X
Helianthus annuus	annual sunflower	X X 0 0		X X 0 0	X X 0 0	X X X X	X		X X X	X X					X X		X X X																X	X
Helianthus ciliaris	blueweed				X												X						X				X X							
Helianthus petiolaris	prairie sunflower						X								0																			

Table C-1 (continued)

SPECIES OCCURRENCE BY RANGE SITE AND CONDITION CLASSES

Scientific Name	Common Name	Loamy Plains WP E G F P	Shallow Hills WP E G F P	Sandy Slopes WP E G F P	Flood Plain WP E G F P	Meadow WP E G F P	Basalt Hills WP E G F P	Malpais WP E G F P	Loamy WP E G F P	Sandy WP E G F P	Gravelly WP E G F P	Deep Sand WP E G F P	Shallow WP E G F P	Cinder WP E G F P	Bottomland WP E G F P	Clayey Bottomland WP E G F P	Swale WP E G F P	Shallow Sandstone WP E G F P	Sandstone Hills WP E G F P	Limestone Hills WP E G F P	Hills WP E G F P	Salt Flats WP E G F P	Savannah WP E G F P	Pine Grassland AN E G F P	Mountain Malpais AN E G F P	Stony Loam AN E G F P	Mountain Upland AN E G F P	Shallow Hills AN E G F P	Mountain Breaks AN E G F P	Mountain Swale AN E G F P	Shallow Savannah AN E G F P	Basalt Hills AN E G F P	Rocky-Mountain Malpais AN E G F P	Rocky-Mountain Loam AN E G F P
FORBS (continued)																																		
Heterotheca villosa	hairy goldaster						X X	X 0	X	X	X		X				X X		X X		X X		X			X X	X					X X	X X	X
Hymenopappus spp.	rubberweed				X								X	X																				
Hymenoxys richardsonii	pingue	X	X	X	X		X X	X 0	X X X	X 0 X	X	X 0	X	X	0 X	X X	X X 0	X X	0		X X X	X	X X	X X 0 0	X X	X X 0	X X X		X	X X	X	X X	X X	X 0 X
Iris missouriensis	Rocky Mountain iris					X 0											X												X					
Kochia scoparia	fireweed summercypress	X X 0 0							0	X							0																	
Lappula redowskii	stickseed				X X		X X	X	X X 0 X	X			X	X	X		0	X X	X		X X X	X X X	X X		X	X	X X			X 0	X	X X	X X	X
Lepidum montanum							X		X X	X X	X	X	X	X	X		0				X													X
Lepidium spp.	annual peppergrass	X					X	X	X X 0	0 X X	X		X				X X X	X X	X		X X		X X											X
Lesquerella spp.	bladderpod			X			X X		X X 0	X	X X		X	X			0	X X	X X		X X X		X X			X	X				X	X X		X
Leucelene ericoides		X		X	X X		X X	X X	X X 0 X	X X X	X 0	X	X	X	X X	X X	X X X	X X	X X		X X X	X	X X X		X X	X 0	X X			X X	0	X X	0 X	X X
Linum spp.	flax						X X		X												X				X	X	X			X		X X		
Lupinus spp.	lupine		X	X X 0 0															X		X							X		X				
Machaeranthera spp.	perennial asters						X		X				X														X			0				
Machaeranthera tanacetifloia	tansyleaf aster			X	X		X	X X	X X 0	0 X X	X	X X		X	X		X X	X	X		X X X	X	X				X			X X		X	X X	X X
Mentzelia pumila	stickleaf						X	X	X X X	X X X	X	X X			X		X X X				X X		X							X			X X	
Mirabilis multiflora							X X		X	X X	X		X					X			X		X X				X				X	X		X
Oenothera spp.	evening primrose			X						X X					X															X X	X			
Penstemon jamesii										X											X X											X		
Phacelia spp.	phacelia				X X		X X	X X		X X		X			X X				X		X X					X	X						X X	X X
Plantago spp.	plantain		X	X	X X 0 0	X X		X X X	X X	X X			X		X X		X	X	X X		X X X		X				X						X X	X
Portulaca spp.	purslane			X	X X X X					X																								
Potentilla spp.	potentilla															X	X						X			X	X X			X X		X	X	X
Psilostrophe tagetina	wooly paperflower								X	X	X										X		X				X							
Psoralea lanceolata	lemon scurfpea											0																						
Salsola kali	Russian thistle	X X 0 0	X	X X 0 0	X 0 0		X	X	X X 0 0	X 0 X	X X	X X X	X		0 X X	X X	0 0 0	X 0	X		X X X	X X X	X X X							X			X	X
Senecio spp.	groundsel	X X X X		X X X X	X X 0 0		X X	X X	X X X	X X	X X	X		X	X		X X	X	X		X X X		X X		X	X X	X X			X X	X	0 X	X	X
Sisymbrium linearifolium							X			X			X								X		X			X X					X	X X		
Sphaeralcea digitata	juniper globemallow	X 0	X	X	X 0		X X	X X	X 0 0	X X X	X X	X X		X	X	X	X 0 X	X X	X		X X X		X X		X X	X X X	X X X			X X	X	X X	X X X	X
Sphaeralcea incana					X		X	X	X X	X X X	X X	X					X X		X		X X	X			X		X X			X	X		X X	
Suaeda spp.	seepweed																					X 0 0 0												
Townsendia spp.	Townsendia								X																									
Tragia spp.	noseburn						X		X										X		X						X							
Verbascum thapsus	mullein		X																								X						X	
Verbena spp.	verbena						X X		X	X X				X			X				X X		X		X	X	X X			X	X			
Verbesina encelioides	golden crownbeard																													X X				
Vicia americana	American vetch																		0															
Viguiera spp.	goldeneye						X																				X							
Zinnia grandiflora	plains zinnia						X X	X	X X X	0 0 X	X 0	X X	X			X	0 X	X X	X X		X X X		X X X		X	X	X			X	X	X X	X	X

Meadow WP includes riparian. Barren is considered a non-range site.

Ø - Consistent major constituent (Grasses > 10% by weight, Forbs > 10%, Woody > 5%)
0 - Occasional major constituent (Grasses > 10% by weight, Forbs > 10%, Woody > 5%). In excellent condition, these may include species lumped with others in the allowable percentage categories.
X - Minor constituent
WP - Western Plateau MLRA
AN - Arizona and New Mexico Mountains MLRA
E - Excellent Condition
G - Good Condition
F - Fair Condition
P - Poor Condition

1/ Species renamed Bothriochloa barbinodis
2/ Species renamed Bothriochloa saccharoides
3/ Species renamed Schizachyrium scoparium
4/ Species renamed Ceratoides lanata
5/ Species renamed Zanthocephalum sarothrae

Sources: BLM Socorro District Planning Area SVIM Data 1978 and 1979, SCS Range Site Descriptions 1977, 1978, 1980, 1981.

(Western Plateau)
Loamy Range Site

POTENTIAL NATURAL PLANT COMMUNITY

1. This is a grassland site characterized by a mixture of warm- and cool-season grasses. Dominants are blue grama and western wheatgrass. Also characteristic are such species as bottlebrush squirreltail, spike muhly, sand dropseed, needle-and-thread, and New Mexico feathergrass. Shrubs and half-shrubs include four-wing saltbush and winterfat. Typical forbs are Wright buckwheat, Rocky Mountain beeplant, and species of Astragalus.

2. Composition of Potential Plant Community - Approximate percentage of total annual herbage production.

Grasses and Grasslike - 75-85%		(Shrubs, half-shrubs, vines and trees) Woody - 10-15%		Forbs - 5-10%	
Blue grama	20-25	Four-wing saltbush	1-5	Perennials	1-8
Western wheatgrass	10-20	Winterfat	1-5	Annuals	1-5
Spike muhly	8-12	Bigelow sagebrush	1-5		
Bottlebrush squirreltail	5-10	Fringed sagewort			
New Mexico feathergrass	5-10	Broom snakeweed	1-3		
Needle-and-thread		Spineless horsebrush			
Galleta	1-5	Rabbitbrush			
Sideoats grama	1-5	Wolfberry	1-3		
Wolftail	1-5	Apache-plume			
Sand dropseed					
Ring muhly	1-5				
False buffalograss					
Threeawns spp.					
Black grama	1-3				
Alkali sacaton	1-5				

3. Canopy Cover - Shrubs and half-shrubs - 6%.

4. Ground Cover (Average Percent of Surface Area).

Grasses and forbs	25
Bare ground	53
Surface gravel	5
Surface cobble and stones	1
Litter - percent of area	16
- average depth in cm.	2

TOTAL ANNUAL HERBAGE PRODUCTION (Air-dry, lbs./ac)

Favorable years - 950 (Average)
Unfavorable years - 375 (Average)

APPENDIX D

Wildlife

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
NEW MEXICO STATE OFFICE
P.O. BOX 1449
SANTA FE, NEW MEXICO 87501

IN REPLY REFER TO
1792 (931)
x6840

DEC 23 1981

Memorandum

To: Regional Director, USFWS, Albuquerque, NM

From: State Director, BLM, Santa Fe, NM

Subject: List Request for Threatened, Endangered, Proposed and Candidate Plant Species - West Socorro Rangeland Management Environmental Impact Statement Area (EIS)

The Bureau of Land Management is preparing an Environmental Impact Statement for the Divide Planning Area (see enclosed map) of the San Augustine Resource Area, Socorro District, in support of the Bureau's Rangeland Management Program. In compliance with Section 7 of the Endangered Species Act of 1973 (as amended), we are requesting that you provide us with a listing of Federal endangered, threatened and proposed species potentially occurring in the Planning Area. In addition, in compliance with Bureau policy, we would like to request a listing of plant species which are candidates for Federal listing which potentially occur in the Planning Area (Federal Register Monday, December 15, 1980).

A summary (enclosure 2) of the proposed action is also included for your information. Any questions in reference to this request should be directed to Andy Dimas - Endangered Species Coordinator, New Mexico State Office, FTS 476-6231.

Enclosures

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE

POST OFFICE BOX 1306
ALBUQUERQUE, NEW MEXICO 87103

January 22, 1982

MEMORANDUM

TO : State Director, Bureau of Land Management, New Mexico State Office, P.O. Box 1449, Albuquerque, New Mexico 87104

FROM : Assistant Regional Director, Region 2 (SE)

SUBJECT: Species List for West Socorro Rangeland Management Environmental Impact Statement Area

This is an amended list of species based on a telephone conversation with Wayne Ludington and Glenn Sekavec on January 21, 1982. Discussions on that day were related to the areas which could potentially be impacted, and type of impact of your proposed rangeland management project. Your area of interest is the San Angustine Resource Area, Socorro District, New Mexico.

As provided by Section 7(c)(1) of the Endangered Species Act, the Fish and Wildlife Service is required to furnish a list of those species, both proposed and listed, that may be affected by Federal construction activities.

Upon receipt of the Fish and Wildlife Service's species list, the Federal agency authorizing, funding or carrying out the construction action is required to conduct a biological assessment for the purpose of identifying listed and proposed species which are likely to be affected by such action.

The biological assessment shall be completed within 180 days after receipt of the species list, unless it is mutually agreed to extend this period. If the assessment is not initiated within 90 days after receipt of the species list, I suggest its accuracy be verified before conducting the assessment.

Biological assessments should include as a minimum:

1) an onsite inspection of the area affected by the proposed activity or program, which may include a detailed survey of the area to determine if species are present and whether suitable habitat exists for either expanding the existing population or potential reintroductions of populations;

2) interview recognized experts on the species at issue, including the Fish and Wildlife Service, State conservation departments, universities, and others who may have data not yet found in scientific literature;

3) review literature and other scientific data to determine the species distribution, habitat needs, and other biological requirements;

4) review and analyze the effects of the proposal on the species, in terms of individuals and populations, including consideration of both direct and indirect effects of the proposal on the species and its habitat;

5) analyze alternative actions that may provide conservation actions;

6) other relevant information;

7) report documenting the assessment results.

For purposes of providing interim guidance, the Fish and Wildlife Service considers construction projects to be any major Federal action authorized, funded or carried out by a Federal agency which significantly affects the quality of the human environment and which is designed primarily to result in the building or erection of man-made structures such as dams, buildings, roads, pipelines, channels, and the like. Normally these projects will require an environmental impact statement.

If the Federal permitting action is not a construction project, there is no need to prepare a biological assessment. However, it remains incumbent upon the Federal agency to assess whether the Federal action may affect endangered and threatened species.

If the biological assessment or other assessment indicates the proposed project may affect listed species, the formal consultation process shall be initiated by writing to the Regional Director, Region 2, U.S. Fish and Wildlife Service, P.O. Box 1306, Albuquerque, New Mexico 87103. If no effect is evident, there is no need for further consultation. I would, however, appreciate the opportunity to review your biological assessment.

In addition, the Act (Sec. 7(c)(1)) now requires Federal agencies to confer with the Service on any agency action which is likely to jeopardize the continued existence of any species proposed to be listed as endangered or threatened or adversely modify critical habitat proposed to be designated for such species. The purpose of this requirement is to identify and resolve at the early planning stage of an action, all potential conflicts between the action and the respective species and critical habitat. The informal consultation process can accomplish this requirement.

The attached sheets provide information on listed species which may occur in the area of interest. If you have need of further assistance, please call the Office of Endangered Species at (505) 766-3972 or FTS 474-3972.

R. J. Stephens

Attachment

cc: Area Office, Phoenix, Arizona (SE)
Ecological Services Field Station, Albuquerque, New Mexico

West Socorro Rangeland Management Area
Catron, Cibola, Valencia, and Socorro Counties, New Mexico

LISTED SPECIES

Black-footed ferret (*Mustela nigripes*) - Surveys for ferrets on linear projects or on prairie dog towns under 50 acres are not required. Surveys on dog towns over 50 acres may be required depending on type of impact and amount of dog town affected.

Peregrine falcon (*Falco peregrinus*) - Gila National Forest contains a number of eyries. Suitability of BLM lands for peregrine falcons is unknown.

Bald eagle (*Haliaeetus leucocephalus*) - May occur in proposed impact area only during winter period.

PROPOSED SPECIES

None.

CRITICAL HABITAT

None.

CANDIDATE PLANT SPECIES

Alium gooddingii	Catron County
Erigeron hessii	Catron County
Erigeron rhizomatus	Catron and McKinley Counties
Astragalus accumbens	Valencia County
Pediocactus papyracanthus	Valencia County
Senecio quaerens	Socorro and Catron Counties

TABLE D-1

MAMMALS OF THE DIVIDE PLANNING AREA

Mammals of the Divide Planning Area
Relative Abundance by Season

V-Verified
H-Hypothetical

A-Abundant
C-Common
U-Uncommon
R-Rare

	Vegetation Type	Xasa Bogr				Chna Bogr				Pied Jumo				Saka Spai				Atca Bogr				Pipo Pied				Pipo Pied			
		Standard Habitat Sites*																											
	Land Form	Hill				Hill				Hill				Valley				Valley				Lava				Mountain			
		Season of Use																											
Species	Special Habitat Features	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W
Merriam's Shrew *Sorex merriami*	Above 8,000' Elevation																					C H	C H	C H	C H	C H	C H	C H	C H
Vagrant Shrew *Sorex vagrans*	Above 7,400' elevation																					C H	C H	C H	C H	C H	C H	C H	C H
Yuma Myotis *Myotis yumanensis*	Permanent water below 7,000' elevation	C H	C H	C H		C H	C H	C H		C H	C H	C H		C H	C H	C H		C H	C H	C H		C H	C H	C H					
Fringed Myotis *Myotis thysanodes*	Caves/buildings	C H	C H	C H		C H	C H	C H		C H	C H	C H		C H	C H	C H		C H	C H	C H		C H	C H	C H					
California Myotis *Myotis californicus*	Rocky cliffs/caves	C H	C H	C H		C H	C H	C H		C H	C H	C H	C H	C H	C H	C H		C H	C H	C H		C H	C H	C H	U H				
Small-footed Myotis *Myotis leibii*	Caves/rock crevices	C H	C H	C H		C H	C H	C H		C H	C H	C H		C H	C H	C H		C H	C H	C H		C H	C H	C H		U H	U H	U H	
Little Brown Myotis *Myotis lucifugus*	Abandoned buildings/caves	C H	C H	C H		C H	C H	C H		C H	C H	C H		C H	C H	C H		C H	C H	C H		C H	C H	C H					
Southwestern Myotis *Myotis auriculus*	Caves/water/abandoned buildings													C H	C H	C H						C H	C H	C H		C H	C H	C H	
Long-eared Myotis *Myotis evotis*	Abandoned buildings/ caves/water													C H	C H	C H						C H	C H	C H		C H	C H	C H	
Long-legged Myotis *Myotis volans*	Abandoned buildings													C H	C H	C H						C H	C H	C H		C H	C H	C H	
Big-brown Bat *Eptesicus fuscus*	Caves/buildings	U H	U H	U H		U H	U H	U H		C H	C H	C H		U H	U H	U H		U H	U H	U H		C H	C H	C H		C H	C H	C H	
Spotted Bat *Euderma maculatum*	Rock cliffs/water									R H	R H	R H		R H	R H	R H		R H	R H	R H		R H	R H	R H		R H	R H	R H	
Townsend's Big-eared Bat *Plecotus townsendii*	Caves/rock crevices/mines	C H	C H	C H	C H	C H	C H	C H	C H	C H	C H	C H	C H	C H	C H	C H	C H	C H	C H	C H	C H	C H	C H	C H	C H	C H	C H	C H	C H
Pallid Bat *Antrozous pallidus*	Caves/trees/rock crevices below 7,200' elevation	C H	C H	C H		C H	C H	C H		C H	C H	C H		C H	C H	C H		C H	C H	C H		C H	C H	C H					
Brazilian Free-tailed Bat *Tadarida braziliensis*	Caves/below 6,000' elevation	C V	C H	C H		C H	C V	C H		C H	C V	C H		C H	C V	C H		C H	C V	C H		C V	C V	C H					
Big Free-tailed Bat *Tadarida macrotis*	Rocky crevice/caves below 8,000' elevation	U H	U H	U H		U H	U H	U H		U H	U H	U H		U H	U H	U H		U H	U H	U H		C H	C H	C H					
Silver-haired Bat *Lasionycteris noctivagans*	Tree rooting/caves	U H	C H	U H		U H	C H	U H		U H	C H	U H		U H	C H	U H		C H	C H	U H		C H	C H	U H		C H	A H	C H	
Western Pipistrelle *Pipistrellus hesperus*	Cliffs/rock crevices/ caves	C H	C H	C H		C H	C H	C H		C H	C H	C H		U H	U H	U H		U H	U H	U H		U H	U H	U H					
Hoary Bat *Lasiurus cinereus*	Cliffs/caves/mines	C H	C H	C H		C H	C H	C H		C H	C H	C H		C H	C H	C H													
Allen's Big-eared Bat *Idionycteris phyllotis*	Forested zones	U H	U H	U H		U H	U H	U H		C H	C H	C H		U H	U H	U H		U H	U H	U H		C H	C H	C H		R H	R H	R H	
Mountain Cottontail *Sylvilagus nutallii*										C H	C H	C H										C H	C H	C H		C H	C H	C H	
Desert Cottontail *Sylvilagus audubonii*		C V	C V	C V	C V	C V	C V	C V	C V	U H	U H	U H	U H	C V	C V	C V	C V	C V	C V	C V	C V	U H	U H	U H	U H				
Eastern Cottontail *Sylvilagus floridanus*		U H	U H	U H	U H	U H	U H	U H	U H	C V	C V	C V	U H	U H	U H	U H	U H	U H	U H	U H	U H	C V	C V	C V	U V	U H	U H	U H	U H
Black-tailed Jackrabbit *Lepus californicus*		C V	C V	C V	C V	C V	C V	C V	C V	C V	C V	C V	C V	C V	C V	C V	C V	C V	C V	C V	C V	U H	U H	U H	U H	U H	U H	U H	U H

TABLE D-1 (continued)
MAMMALS OF THE DIVIDE PLANNING AREA

Mammals of the Divide Planning Area
Relative Abundance by Season

V-Verified
H-Hypothetical

A-Abundant
C-Common
U-Uncommon
R-Rare

Standard Habitat Sites*

Season of Use

	Vegetation Type	Xasa Bogr				Chna Bogr				Pied Jumo				Saka Spai				Atca Bogr				Pipo Pied				Pipo Pied			
	Land Form	Hill				Hill				Hill				Valley				Valley				Lava				Mountain			
Species	Special Habitat Features	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W
Cliff Chipmunk										C	C	C										C	C	C		C	C	C	
Eutamias dorsalis										V	V	V										V	V	V		V	V	V	
White-tailed Antelope Squirrel	Sandy soil	C	C	C		C	C	C						C	C	C		C	C	C		C	C	C					
Ammospermophilus leucurus		V	V	V		V	V	V						V	V	V		V	V	V		V	V	V					
Thirteen-lined Ground Squirrel		C	C	C		C	C	C						C	C	C		C	C	C									
Spermophilus tridecemlineatus		V	V	V		V	V	V						V	V	V		H	H	H									
Spotted Ground Squirrel		A	A	A		A	A	A						C	C	C		C	C	C									
Spermophilus spilosoma		V	V	V		V	V	V						V	V	V		H	H	H									
Rock Squirrel										C	C	C		U	U	U		C	C	C		C	C	C					
Spermophilus variegatus										V	V	V		H	H	H		H	H	H		V	V	V					
Golden-mantled Ground Squirrel										C	C	C										U	U	U					
Spermophilus lateralis										V	V	V										H	H	H					
Abert's Squirrel (G)										C	C	C	U									C	C	C	U	C	C	C	U
Sciurus aberti										V	V	V	V									V	V	V	V	V	V	V	V
Red Squirrel (G)										R	R	R										R	R	R		R	R	R	
Tamiasciurus hudsonicus										H	H	H										H	H	H		H	H	H	
Black-tailed Prairie Dog		U	U	U		U	U	U		U	U	U																	
Cynomys ludovicianus		H	H	H		H	H	H		H	H	H																	
Gunnison's Prairie Dog		C	C	C		C	C	C		C	C	C		C	C	C		C	C	C		C	C	C					
Cynomys gunnisoni		V	V	V		V	V	V		V	V	V		V	V	V		V	V	V		V	V	V					
Southern Pocket Gopher																		R	R	R									
Thomomys umbrinus																		H	H	H									
Northern Pocket Gopher	Parks/meadows									U	U	U														U	U	U	
Thomomys talpoides										H	H	H														H	H	H	
Yellow-faced Pocket Gopher		R	R	R		R	R	R										R	R	R									
Pappogeomys castanops		H	H	H		H	H	H										H	H	H									
Botta's Pocket Gopher		C	C	C		C	C	C										C	C	C									
Thomomys bottae		V	V	V		V	V	V										V	V	V									
Silky Pocket Mouse		C	C	C		C	C	C		C	C	C		C	C	C		C	C	C		C	C	C					
Perognathus flavus		V	V	V		V	V	V		H	H	H		H	H	H		H	H	H		V	V	V					
Plains Pocket Mouse		U	U	U		U	U	U		R	R	R		C	C	C		C	C	C		R	R	R					
Perognathus flavescens		H	H	H		H	H	H		H	H	H		H	H	H		H	H	H		H	H	H					
Ord's Kangaroo Rat	Sandy soil	C	C	C	U	C	C	C	U	C	C	C	U	C	C	C	U	C	C	C	U	U	U	U	U	U	U	U	U
Dipodomys ordii		V	V	V	V	V	V	V	V	H	H	H	H	V	V	V	V	V	V	V	V	H	H	H	H	H	H	H	H
Banner-tailed Kangaroo Rat		U	U	U	U	U	U	U	U					U	U	U	U	U	U	U	U								
Dipodomys spectabilis		V	V	V	V	V	V	V	V					H	H	H	H	H	H	H	H								
Merriam's Kangaroo Rat		R	R	R	R	R	R	R	R																				
Dipodomys merriami		H	H	H	H	H	H	H	H																				
Western Harvest Mouse		C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C								
Reithrodontomys megalotis		V	V	V	H	V	V	V	H	V	V	V	H	V	V	V	H	V	V	V	H								
Plains Harvest Mouse		U	U	U	U	U	U	U		U	U	U		U	U	U		U	U	U									
Reithrodontomys montanus		H	H	H	H	H	H	H		H	H	H		H	H	H		H	H	H									
Cactus Mouse	North limit south facing slope	U	U	U	U	U	U	U	U	U	U	U	U	C	C	C	C	C	C	C	C								
Peromyscus eremicus		H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H								
Deer Mouse		C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
Peromyscus maniculatus		V	V	V	H	V	V	V	H	V	V	V	H	V	V	V	H	V	V	V	H	V	V	V	H	V	V	V	H
White-footed Mouse														C	C	C	C	C	C	C	C								
Peromyscus leucopus														H	H	H	H	H	H	H	H								

TABLE D-1 (continued)

MAMMALS OF THE DIVIDE PLANNING AREA

Mammals of the Divide Planning Area
Relative Abundance by Season
V-Verified
H-Hypothetical
A-Abundant
C-Common
U-Uncommon
R-Rare

Species	Special Habitat Features	Standard Habitat Sites*																											
	Vegetation Type	Xasa Bogr				Chna Bogr				Pied Jumo				Saka Spai				Atca Bogr				Pipo Pied				Pipo Pied			
	Land Form	Hill				Hill				Hill				Valley				Valley				Lava				Mountain			
		Season of Use																											
		Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W
Brush Mouse	Dense oak/brushy areas					C	C	C	C	C	C	C	C	C	C	C	U	C	C	C	U					U	U	U	R
Peromyscus boylii						V	V	V	H	V	V	V	H	V	V	V	H	V	V	V	H					H	H	H	H
Pinyon Mouse	Pinyon-juniper woodland									C	C	C	C									C	C	C	C	C	C	C	C
Peromyscus truei										V	V	V	H									V	V	V	H	V	V	V	H
Rock Mouse	Rocky areas									C	C	C	C									A	A	A	C				
Peromyscus difficilis										H	H	H	H									H	H	H	H				
Northern Grasshopper Mouse		C	C	C	U	C	C	C	U					C	C	C	U	C	C	C	U								
Onychomys leucogaster		V	V	V	H	V	V	V	H					V	V	V	H	V	V	V	H								
Tawny-bellied Cottonrat		U	U	U	U	U	U	U	U																				
Signodon fulviventor		H	H	H	H	H	H	H	H																				
Southern Plains Woodrat										C	C	C	C					C	C	C	C	C	C	C	C	C	C	C	C
Neotoma micropus										H	H	H	H					H	H	H	H	H	H	H	H	H	H	H	H
White-Throated Woodrat						C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C				
Neotoma albigula						V	V	V	H	V	V	V	H	V	V	V	H	V	V	V	H	V	V	V	H				
Stephen's Woodrat										C	C	C	C									C	C	C	C				
Neotoma stephensi										H	H	H	H									H	H	H	H				
Mexican Woodrat																										C	C	C	C
Neotoma mexicana																										H	H	H	H
Long-tailed Vole																										U	U	U	U
Microtus longicaudus																										H	H	H	H
Mexican Vole										U	U	U	U													U	U	U	U
Mictrotus mexicanus										H	H	H	H													H	H	H	H
Beaver (FB)	Permanent water									U	U	U	U																
Castor canadensis										H	V	H	H																
Porcupine										C	C	C	C									C	C	C	C	C	C	C	C
Erethizon dorsatum										V	V	V	H									V	V	V	H	V	V	V	H
Coyote		C	C	C	C	C	C	C	C	U	U	U	U	C	C	C	C	C	C	C	C	U	U	U	U	U	U	U	U
Canis latrans		V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	H	H	V	H	H	H	H
Kit Fox (FB)		C	C	C	C	C	C	C	C	U	U	U	U	C	C	C	C	C	C	C	C	U	U	U	U	U	U	U	U
Vulpes macrotis		V	V	V	H	V	V	V	H	V	V	V	H	V	V	V	H	V	V	V	H	H	H	H	H	H	H	H	H
Gray Fox (FB)		U	U	U	U	U	U	U	U	C	C	C	C	U	U	U	U	U	U	U	U	C	C	C	C	C	C	C	C
Urocyon cinereoargenteus		V	V	V	H	V	H	H	H	V	V	V	H	H	H	H	H	H	H	H	H	V	V	V	V	V	V	V	V
Black Bear (BG)																										U	U	U	U
Ursus americanus																										V	V	V	H
Ringtail (FB)	Rocky areas									U	U	U	U					U	U	U	U	U	U	U	U				
Bassariscus astutus										V	V	V	H					V	V	V	H	H	H	H	H				
Long-tailed Weasel (FB)		U	U	U	U	U	U	U	U	U	U	U	U																
Mustela frenata		V	V	H	H	V	V	H	H	V	V	H	H																
Black-footed Ferret (FE)	Prairie dog towns	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R				
Mustela nigripes		H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H				
Badger (FB)		C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	U	U	U	U	C	C	C	C
Taxidea taxus		V	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H
Western Spotted Skunk	Rocky/brushy areas	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	U	U	U	U	U	U	U	U
Spilogale gracilis		H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H
Striped Skunk		C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
Mephitis mephitis		V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	H	H	H	H	H	H	H	H
Hog-nosed Skunk		C	C	C	C	U	U	U	U	U	U	U	U	C	C	C	C	C	C	C	C	U	U	U	U	U	U	U	U
Conepatus mesoleucus		V	V	V	V	H	H	H	H	H	H	H	H	V	V	V	V	V	V	V	V	H	H	H	H	H	H	H	H

TABLE D-1 (continued)

MAMMALS OF THE DIVIDE PLANNING AREA

Mammals of the Divide Planning Area
Relative Abundance by Season

V-Verified
H-Hypothetical

A-Abundant
C-Common
U-Uncommon
R-Rare

Standard Habitat Sites*

	Vegetation Type Land Form	Xasa Bogr Hill				Chna Bogr Hill				Pied Jumo Hill				Saka Spai Valley				Atca Bogr Valley				Pipo Pied Lava				Pipo Pied Mountain			
Species	Special Habitat Features	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W
Mountain Lion (BG) *Felis concolor*										U V	U V	U V	U V									U H	U H	U H	U H	U V	U V	U V	U V
Bobcat (FB) *Lynx rufus*		U H	U H	U H	U H	U H	U H	U H	U H	C V	C H	C H	C V	U H	U H	U H	U H	U H	U H	U H	U H	U H	U H	U H	U H	U H	U V	U V	U H
Elk (BG) *Cervus elaphus*																										U H	U H	U H	U H
Mule Deer (BG) *Odocoileus hemionus*										C V	C V	C V	C V									C V	C V	C V	C V	C V	C V	C V	C V
Pronghorn Antelope (BG) *Antilocapra americana*		C V	C V	C V	C V	C V	C V	C V	C V	U V	U V	U V	C V	C V	C V	C V	C V	C V	C V	C V	C V	U V	U V	U V	U V				
Barbary Sheep (BG) *Ammotragus lervia*	Rocky areas																					U H	U H	U H	U H				
Horse *Equus caballus*		C V	C V	C V	C V	C V	C V	C V	C V	C V	C V	C V	C V	C V	C V	C V	C V	C V	C V	C V	C V	R H	R H	R H	R H	U H	U H	U H	U H
Cow *Bos spp.*		A V	A V	A V	A V	A V	A V	A V	A V	A V	A V	A V	A V	A V	A V	A V	A V	A V	A V	A V	A V	R H	R H	R H	R H	U V	U V	U V	U V
Burro *Equus asinus*						U V	U V	U H	U H									U V	U V	U H	U H					C V	C V	C V	C V

TABLE D-1 (continued)

AMPHIBIANS OF THE DIVIDE PLANNING AREA

Amphibians of the Divide Planning Area
Relative Abundance by Season

V-Verified
H-Hypothetical

A-Abundant
C-Common
U-Uncommon
R-Rare

Standard Habitat Sites*

	Vegetation Type	*Xasa* *Bogr*				*Chna* *Bogr*				*Pied* *Jumo*				*Saka* *Spai*				*Atca* *Bogr*				*Pipo* *Pied*				*Pipo* *Pied*			
	Land Form	Hill				Hill				Hill				Valley				Valley				Lava				Mountain			
		Season of Use																											
Species	Special Habitat Features	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W
Barred Tiger Salamander *Ambystoma tigrinum navortium*	Permanent water	C H	C H			C V	C V			C V	C V			C H	C H			C H	C H							C V	C V		
Arizona Tiger Salamander *Ambystoma t. nebulosum*	" "	C V	C V			C V	C V			C V	C V			C V	C V			C V	C V							C V	C V		
Plains Spadefoot *Scaphiopus bombifrons*	Permanent water/ temporary pools	C V	C V			C V	C V							C V	C V			C V	C V										
Western Spadefoot *Scaphiopus hammondi*	" "	C V	C V			C V	C V			C V	C V			C V	C V			C V	C V										
Great Basin Spadefoot *Scaphiopus intermontanus*	" "	U H	U H			U H	U H			U H	U H			U H	U H			U H	U H										
Woodhouse's Toad *Bufo woodhousii*	" "									C V	C V											C V	C V						
Southwestern Toad *Bufo microscaphus*	" "									C H	C H											C H	C H						
Great Plains Toad *Bufo cognatus*	" "	U H	U H			U H	U H							U H	U H			U H	U H										
Red-spotted Toad *Bufo punctatus*	" "	C H	C H			C H	C H			C V	C V							C V	C V			C V	C V						
Bullfrog *Rana catesbeiana*	" "	C V	C V			C V	C V			C V	C V			C V	C V			C V	C V			C H	C H						
Leopard Frog *Rana pipiens*	" "	C V	C V			C V	C V			C V	C V			C V	C V			C V	C V			C V	C V						
Canyon Tree Frog *Hyla arenicolor*	" "	U H	U H			U H	U H			U H	U H											U H	U H						
Western Chorus Frog *Pseudacris triseriata triseriata*	" "																									C H	C H		
Arizona Tree Frog *Hyla wrightourm*	" "									U H	U H															U H	U H		

TABLE D-1 (continued)

BIRDS OF THE DIVIDE PLANNING AREA

Birds of the Divide Planning Area
Relative Abundance by Season

V-Verified
H-Hypothetical

A-Abundant
C-Common
U-Uncommon
R-Rare

		Standard Habitat Sites*																											
	Vegetation Type	Xasa Bogr				Chna Bogr				Pied Jumo				Saka Spai				Atca Bogr				Pipo Pied				Pipo Pied			
	Land Form	Hill				Hill				Hill				Valley				Valley				Lava				Mountain			
		Season of Use																											
Species	Special Habitat Features	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W
Pie-billed Grebe	Stock ponds	U	U	U	U																								
Podilymbus podiceps																													
Mallard (SG)	" "	C	U	C	C	C	U	C	C	C	U	C	C	C	U	C	C	C	U	C	C	C	U	C	C	C	U	C	C
Anas platyrhynchos		V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
Gadwall (SG)	" "	U		U	U	U		U	U	U		U	U	U		U	U	U		U	U	U		U	U	U		U	U
Anas strepera		V		V	V	V		V	V	V		V	V	V		V	V	V		V	V	V		V	V	V		V	V
Pintail (SG)	" "	U		C	C	U		C	C	U		C	C	U		C	C	U		C	C	U		C	C	U		C	C
Anas acuta		V		V	V	V		V	V	V		V	V	V		V	V	V		V	V	V		V	V	V		V	V
Green-winged Teal (SG)	" "	C	U	C	C	C	U	C	C	C	U	C	C	C	U	C	C	C	U	C	C	C	U	C	C	C	U	C	C
Anas crecca		V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
Cinnamon Teal (SG)	" "	C	U	C	C	C	U	C	C	C	U	C	C	C	U	C	C	C	U	C	C	C	U	C	C	C	U	C	C
Anas cyanoptera		V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
American Widgeon (SG)	" "	U		U	U	U		U	U	U		U	U	U		U	U	U		U	U	U		U	U	U		U	U
Anas americana		H		H	H	H		H	H	H		H	H	H		H	H	H		H	H	H		H	H	H		H	H
Northern Shoveler (SG)	" "	C		C	C	C		C	C	C		C	C	C		C	C	C		C	C	C		C	C	C		C	C
Anas clypeata		H		V	H	H		H	H	H		V	V	H		V	H	V		H	H	H		H	H	H		V	H
Redhead (SG)	" "	U		U	U	U		U	U	U		U	U	U		U	U	U		U	U	U		U	U	U		U	U
Aythya americana		H		H	H	H		H	H	H		H	H	H		H	H	H		H	H	H		H	H	H		H	H
Ring-necked Duck (SG)	" "	U		U	U	U		U	U	U		U	U	U		U	U	U		U	U	U		U	U	U		U	U
Aythya collaris		H		H	H	H		H	H	H		H	H	H		H	H	H		H	H	H		H	H	H		H	H
Canvasback (SG)	" "	U		U	U	U		U	U	U		U	U	U		U	U	U		U	U	U		U	U	U		U	U
Aythya valisinera		H		H	H	H		H	H	H		H	H	H		H	H	H		H	H	H		H	H	H		H	H
Bufflehead (SG)	" "	U		U	U	U		U	U	U		U	U	U		U	U	U		U	U	U		U	U	U		U	U
Bucephala albeola		H		H	V	H		H	H	H		H	H	H		H	H	H		H	H	H		V	H	H		H	H
Ruddy Duck (SG)	" "	U		U	U	U		U	U	U		U	U	U		U	U	U		U	U	U		U	U	U		U	U
Oxyura jamaicensio		H		V	V	H		V	H	H		H	H	H		H	H	H		H	H	H		H	V	H		H	H
Hooded Merganser (SG)	" "	U		U	U	U		U	U	U		U	U	U		U	U	U		U	U	U		U	U	U		U	U
Lophodytes cucullatus		H		H	H	H		H	H	H		H	H	H		H	H	H		H	H	H		H	H	H		H	H
Common Merganser (SG)		U		U	U																								
Mergus merganser		V		V	V																								
Turkey Vulture		C	C	C		C	C	C		C	C	C		C	C	C		C	C	C		C	C	C		C	C	C	
Cathartes aura		V	V	V		V	V	V		V	V	V		V	V	V		V	V	V		V	V	V		V	V	V	
Goshawk										U	U	U	U									U	U			U	U		
Accipiter gentilis										H	H	H	V									H	H			V	V		
Sharp-shinned Hawk										U		U	U									U		U	U	U		U	U
Accipiter striatus										V		H	V									V		V	V	H		H	H
Cooper's Hawk										U		U	U									U		U	U	U		U	U
Accipiter cooperii										V		V	V									H		V	H	H		H	H
Marsh Hawk		C	R	C	A	C	R	C	A	U		U	C	C		C	C	C		C	C	U		U	U	U		U	U
Circus cyaneus		V	V	V	V	V	H	V	V	V		V	V	V		V	V	V		V	V	V		V	V	H		H	H
Red-tailed Hawk	Cliffs/nesting	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
Buteo jamaicensio		V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V
Swainson's Hawk	Yucca pediment nesting	C	C			C	C			C	C			C	C			C	C			C	C			C	C		
Buteo swainsoni		V	V			V	V			V	V			V	V			V	V			V	V			V	V		
Rough-legged Hawk		C		C	C	C		C	C	C		C	C	C		C	C	C		C	C	U		U	U	U		U	U
Buteo lagopus		V		V	V	V		V	V					H		H	H	V		V	V	H		H	H	H		H	H

BIRDS OF THE DIVIDE PLANNING AREA

Birds of the Divide Planning Area
Relative Abundance by Season

V-Verified
H-Hypothetical

A-Abundant
C-Common
U-Uncommon
R-Rare

Species	Special Habitat Features	Standard Habitat Sites* Xasa Bogr (Vegetation Type) Hill (Land Form)				Chna Bogr Hill				Pied Jumo Hill				Saka Spai Valley				Atca Bogr Valley				Pipo Pied Lava				Pipo Pied Mountain			
	Season of Use	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W
Hairy Woodpecker	Cavity nester									U	U	U	C									C		C	C				
Picoides villosus										V	V	H	V									H		V	V				
Downy Woodpecker	" "									U		U	U																
Picoides pubescens										H		H	V																
Northern Three-toed Woodpecker	" "																					C	C	C		C	C	C	
Picoides tridactylus																						H	H	H		H	V	V	
Western Kingbird		C	C	C		C	C	C		C	C	C		U	U	U		U	U	U									
Tyrannus verticalis		V	V	V		V	V	V		H	H	H		V	V	V		H	V	H									
Cassin's Kingbird		C	C	C		C	C	C		U	U	U		U	U	U		C	C	C		U	U	U		A	A	A	
Tyrannus vociferans		V	V	V		V	V	V		H	V	H		H	V	H		V	V	H		V	V	H		V	V	V	
Ash-throated Flycatcher	Cavity nester	C	C	C		C	C	C		C	C	C		U	U	U		U	U	U		U	U	U		C	C	C	
Myiarchus cinerascens		V	V	V		V	V	V		V	V	V		V	H	H		V	V	V		V	V	H		V	V	V	
Say's Phoebe		C	C	C		C	C	C		C	C	C		C	C	C		U	U	U		C	C	C		U	U	U	
Sayornis saya		V	V	H		V	V	V		V	V	H		V	V	V		V	V	H		V	V	V		H	H	H	
Dusky Flycatcher										U	U	U																	
Empidonax oberholseri										H	V	H																	
Gray Flycatcher										U	U	U										C	C	C					
Empidonax wrightii										H	H	H										V	V	V					
Hammod's Flycatcher										U	U	U										U	U	U		U	U	U	
Empidonax hammondii										H	H	H										H	H	H		H	V	H	
Western Wood Pewee		C	C	C						C	C	C						U	U	U		C	C	C		U	U	U	
Contopus sordidulus		V	V	H						V	V	V						H	V	H		V	V	V		V	V	V	
Olive-sided Flycatcher										U	U	U										U	U	U		U	U	U	
Nuttallornis borealis										H	V	H										V	V	V		V	V	V	
Eastern Kingbird		U	U	U		U	U	U		U	U	U		U	U	U		U	U	U									
Tyrannus tyrannus		H	H	H		H	H	H		H	H	H		H	H	H		H	H	H									
Horned Lark		C	C	C	C	C	C	C	C					C	C	C	C	C	C	C	C								
Eremophilia alpestris		V	V	V	V	V	V	V	V					V	V	V	V	V	V	V	V								
Violet-green Swallow	Cavity nester	C	C	C						C	C	C						C	C	C		C	C	C		C	C	C	
Tachycineta thalassina		V	V	V						V	V	V						V	V	V		V	V	V		V	H	H	
Rough-winged Swallow	Stock ponds/permanent water									U	U	U																	
Stelgidopteryx ruficollis										V	V	H																	
Barn Swallow		U	U	U		U	U	U		U	U	U		U	U	U		U	U	U									
Hirundo rustica		H	H	H		H	H	H		H	H	H		H	H	H		H	H	H									
Cliff Swallow		U	U	U						U	U	U										U	U	U		U	U	U	
Petrochelidon pyrrhonota		H	H	H						H	H	H										H	H	H		H	V	H	
Purple Martin	Cavity nester									U	U	U										U	U	U		U	U	U	
Progne subis										V	V	H										V	V	H		V	V	H	
Stellar's Jay										C	C	C										C	C	C		C	C	C	
Cyanocitta stelleri										V	V	V										V	V	V		V	V	V	
Scrub Jay						U		U	U	C	C	C										U		U	U	C	C	C	
Aphelocoma coerulesans						H		H	V	V	V	V	V									H		V	V	H	V	V	
Mexican Jay						U		U	U	C	C	C	C					U	U	U		U	U	U		U	U	U	
Aphelocoma ultramarina						H		H	H	V	V	V	V					H	V	H		V	V	V		V	V	V	
Pinyon Jay		C	C	C	C	U		U	U	C	C	C	C					C	C	C	C	C	C	A	A				
Gymnorhinus cyanocephalus		V	V	V	V	H		H	H	V	V	V	V					V	V	V	H	V	V	V	V				
Clark's Nutcracker																						U	U	U		U	U	U	
Nucifraga columbiana																						H	H	H		H	V	H	
Common Raven		C	C	C	C	C	C	C	C	C	C	C	A	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
Corvus corax		V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V	V

TABLE D-1 (continued)

BIRDS OF THE DIVIDE PLANNING AREA

Birds of the Divide Planning Area
Relative Abundance by Season

V-Verified
H-Hypothetical

A-Abundant
C-Common
U-Uncommon
R-Rare

Species	Special Habitat Features	Vegetation Type / Land Form: Standard Habitat Sites* Xasa Bogr Hill				Chna Bogr Hill				Pied Jumo Hill				Saka Spai Valley				Atca Bogr Valley				Pipo Pied Lava				Pipo Pied Mountain			
		Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W
Ferruginous Hawk *Buteo regalis*		C V		C V	C V	C V		C V	C V	C V		C V	C V	C V		C V	C V	C V		C V	C V	U H		U H	U H	U H		U H	U H
Golden Eagle *Aquila chrysaetos*	Cliffs/Tall Trees	C V	C V	C V	C V	C V	C V	C V	C V	C V	C V	C V	C V	C V	C V	C V	C V	C V	C V	C V	C V	C V	C V	C V	C V	C V	C V	C V	C V
Bald Eagle (FE, S-I) *Haliaeetus leucocephalus*	Stock ponds/Intermittent streams			R H	R H			R H	R H			R H	R H			R H	R H			R H	R H			R H	R H			R H	R H
Prairie Falcon *Falco mexicanus*	Cliffs/Nesting	U V	U V	U V	U V	U V	U V	U V	U V	U V	U V	U V	U V	U V	U V	U V	U V	U V	U V	U V	U V	U V	U V	U V	U V	U H	U H	U H	U H
Peregrine Falcon (FE, S-I) *Falco peregrinus*	Cliffs/Stock ponds	R H		R H	R H	R H		R H	R H	R H		R V	R H	R		R	R	R H		R H	R H	R H		R V	R H	R H		R H	R H
American Kestrel *Falco sparverius*	Cavity nester	C V	C V	C V	C V	C V	C V	C V	C V	C V	C V	C V	C V	C V	C V	C V	C V	C V	C V	C V	C V	C V	C V	C V	C V	C V	C V	C V	C V
Merlin *Falco columbarius*		U H	U H	U H		U H	U H	U H		U H	U H	U H		U H	U V	U H		U H	U H	U H		U H	U H	U H		U H	U H	U H	
Scaled Quail (SG) *Callipepla squamata*		U V	U V	U H	U V	U V	U V	U V	U					U V	U V	U V	U V	U V	U V	U V	U V								
Gambel's Quail (SG) *Lophortyx gambellii*		U H	U H	U H	U H	U H	U H	U H	U H	U H	U H	U H	U H					U H	U V	U H	U H								
Montezuma Quail (SG) *Cyrtonyx montezumae*										U H	U V	U H	U H													U H	U H	U H	U H
Wild Turkey (BG) *Meleagris gallopava*										U V	U V	U V	U V									U H	U V	U V	U H	U H	U H	U H	U H
American Coot (SG) *Fulica americana*	Stock ponds	C V		C V	C V	C V		C V	C V	C V		C V	C V	C V		C V	C V	C V		C V	C V								
Killdeer *Charadruis vociferus*	Stock ponds	C V	C V	C V		C V	C V	C V		C V	C V	C V		C V	C V	C V		C V	C V	C V									
Mountain Plover *Charadrius montana*	" "	C V	C V	C V		C V	C V	C V		C H	C H	C H		C H	C H	C H		C H	C H	C H		C H	C H	C H		C H	C H	C H	
Long-billed Curleu *Numenius americanus*	" "	U V	U V	U H		U V	U H	U H										U V	U H	U H									
Spotted Sandpiper *Actitis macalaria*	" "	U H	U H	U H		U H	U H	U H										U H	U H	U H									
American Avocet *Recyrvirostra americana*	" "	U H	U H	U H		U H	U V	U H										U V	U H	U H									
Rock Dove *Columba livia*										U V	U V	U H										U H	U V	U H					
Mourning Dove (SG) *Zenaida macroura*	Stock ponds	C H	C V	C H		C V	C V	C V		C V	C V	C V		C V	C V	C V		C V	C V	C V		C V	C V	C V		U V	U V	U V	
Band-tail Pigeon (SG) *Columba fasciata*		U H	U V	U V		U V	U H	U H						U V	U H	U V		U V	U H	U H						C V	C V	C V	
Roadrunner *Geococcyx californianus*		U V	U V	U H	U H	U V	U H	U H	U H	U H	U H	U H	U H	U V	U V	U V	U H	U H	U H	U V	U V	U H	U H	U H	U H				
Barn Owl *Tyto alba*	Abandoned houses Cavity nester	U H	U H	U H	U H	U H	U H	U H	U H	R H	R V	R H	R H	R H	R H	R H	R H	R H	R H	R H	R H	R H	R H	R H	R H				
Screech Owl *Otus asio*	Cavity nester									C V	C V	C V	C V									C V	C V	C V	C V	C V	C V	C V	C V

TABLE D-1 (continued)

BIRDS OF THE DIVIDE PLANNING AREA

Birds of the Divide Planning Area
Relative Abundance by Season

V-Verified
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A-Abundant
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Species	Special Habitat Features	Standard Habitat Sites*																											
	Vegetation Type	Xasa Bogr				Chna Bogr				Pied Jumo				Saka Spai				Atca Bogr				Pipo Pied				Pipo Pied			
	Land Form	Hill				Hill				Hill				Valley				Valley				Lava				Mountain			
	Season of Use	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W
Flammulated Owl *Otus flammeolus*	Cavity nester									U H	U H	U H	U H									U V	U H	U H	U H	U H	U V	U H	U H
Saw-whet Owl *Aegolius acadicus*	Tree cavities									U H	U V	U H	U H									U H	U V	U H	U H	U H	U V	U H	U H
Great-horned Owl *Bubo virginianus*										C V	C V	C V	C V									C V	C V	C V	C V	C V	C V	C V	C V
Pygmy Owl *Glaucidium gnoma*										U H	U H	U H	U H									U H	U H	U H	U H	U H	U H	U H	U H
Burrowing Owl *Athene cunicularia*	Prairie Dog Town	U V	U V	U H	U H	U V	U H	U H	U H					U V	U V	U H	U H	U V	U H	U H	U H								
Spotted Owl *Strix occidentalis*	Cavity nester									U H	U H	U H	U H									U H	U H	U H	U H	U H	U H	U H	U H
Long-eared Owl *Asio otus*		U H	U H	U H	U H	U H	U H	U H	U H	U H	U H	U H	U H									U H	U H	U H	U H	U H	U H	U H	U H
Common Nighthawk *Chordeilus minor*		C V	C V	C V		C V	C V	C V		C V	C V	C V		C V	C V	C V		C V	C V	C V		U V	U V	U V		C V	C V	C V	
Lesser Nighthawk *Chordeiles acutipennis*										U V	U V	U H																	
White-throated Swift *Aeronautes saxatalis*										U V	U V	U V										U V	U V	U V		U V	U V	U V	
Black-chinned Hummingbird *Archilochus alexandri*										U V	U V	U V										U V	U V	U V		U V	U V	U V	
Broad-tailed Hummingbird *Selasphorus platycercus*										C H	C V	C V										U V	U H	U H		C V	C V	C V	
Rufous Hummingbird *Selasphorus rufus*		U V	U V	U V		U V	U V	U V		C H	C V	C H										U V	U V	U V		U V	U V	U V	
Belted Kingfisher *Megaceryle alcyon*	Stock ponds/Permanent water									U V	U V	U V										U V	U V	U V		U V	U V	U V	
Cattle Egret *Bubulcus ibis*	" "	U H	U V	U H		U H	U V	U H																					
Snowy Egret *Leucophoyx thula*	" "	U H	U V	U H		U H	U V	U H																					
Great Blue Heron *Ardea berodias*	" "									U V	U V	U H																	
Common Flicker *Colaptes auratus*	Cavity nester	C V	C V	C V		C V	C H	C V	C V	A V	A V	A V	C V									U V	U V	U V	U V	C V	C V	C V	A V
Ladder-backed Woodpecker *Picoides scalaris*										U H	U V	U H														U H	U V	U H	
Acorn Woodpecker *Melanerpes formicivorus*	Cavity nester									C V	C V	C H														C V	C V	C V	
Lewis' Woodpecker *Melanerpes lewis*	" "	C V	C V	C H						U V	U H	U H						U V	U H	U V		U H	U V	U H		U V	U V	U H	
Yellow-bellied Sapsucker *Sphyrapicus varius*	" "																					C H	C H	C H		C V	C V	C V	
Williamson's Sapsucker *Sphyrapicus thyroideus*	" "																					U H	U H	U H		C V	C V	C V	

TABLE D-1 (continued)

BIRDS OF THE DIVIDE PLANNING AREA

Birds of the Divide Planning Area
Relative Abundance by Season

V-Verified A-Abundant
H-Hypothetical C-Common
U-Uncommon
R-Rare

		Standard Habitat Sites*																											
	Vegetation Type	Xasa Bogr				Chna Bogr				Pied Jumo				Saka Spai				Atca Bogr				Pipo Pied				Pipo Pied			
	Land Form	Hill				Hill				Hill				Valley				Valley				Lava				Mountain			
		Season of Use																											
Species	Special Habitat Features	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W
Mountain Bluebird Sialia currucoides	Cavity nester	C V	C V	C V	C V	C V	C V	C V	C V	C V	C V	C V	C V					C V		C V	C V	C V		C V	C V	C V	C V	C V	
Blue-gray gnatcatcher Podioptila caerulea										U H	U V	U H														C V	C V	C V	
Ruby-crowned Kinglet Regulus calendula		C V	C V	C V	C V					U H		U H	U V													C V	C V	C V	
Golden-crowned Kinglet Regulus satrapa																										U H	U H	U H	
Cedar Waxwing Bombycilla cedrorum										U H	U H	U H										U H	U H	U H		U H	U H	U H	
Loggerhead Shrike Lanius ludovicianus		U V	U V	U V		U V	U V	U V		U V	U V	U V		U V	U V	U H		U H	U H	U H		U H	U H	U H					
Northern Shrike Lanius excubitor										U H	U V	U H																	
Starling Starnus vulgaris		U H	U H	U H		U H	U H	U H		U H	U H	U H		U H	U H	U H		U V	U H	U H	U V	U H	U H	U H					
Gray Vireo Vireo vicinior		U H	U V	U H						C V	C V	C H										U V	U V	U V					
Solitary Vireo Vireo solitarius										C V	C V	C V										C V	C V	C H		C V	C V	C V	
Warbling Vireo Vireo gilvus										U H	U H	U H										U H	U H	U H		U H	U H	U H	
Bell's Vireo (SII) Vireo bellii										R H	R V	R H																	
Orange-crowned Warbler Vermivora celata										U H	U H	U H										U H	U V	U V		U H	U H	U H	
Lucy's Warbler Vermivora luciae										U H	U V	U H										U H	U H	U H		U H	U H	U H	
Virginia's Warbler Vermivora virginiae																						U H	U H	U H		U H	U H	U H	
Olive Warbler Peucedramus taeniatus																						U H	U H	U H		U H	U H	U H	
Yellow-rumped Warbler Dendroica coronata										U H	U H	U H										U V	U V	U V		U V	U V	U H	
Black-throated Gray Warbler Dendroica nigrescons										C V	C V	C V										U H	U H	U H		U H	U H	U H	
Grace's Warbler Dendroica graciae										C V	C V	C V										C V	C V	C V		U V	U V	U V	
Townsend's Warbler Dendroica townsendii										R H	R H	R H										R H	R V	R H		R H	R H	R H	
Chestnut-sided Warbler Dendroica pennsylvanica										U H	U V	U H										U H	U H	U H		U H	U H	U H	
MacGillivarys Warbler Oporornis tolmiei										U H	U V	U H										U H	U H	U H		U H	U H	U H	
Ovenbird Seiurus aurocapillus										R H	R H	R H										R V	R H	R H		R H	R H	R H	
Wilson's Warbler Wilsonia pusilla										U V	U V	U H										U H	U H	U H		U H	U H	U H	

TABLE D-1 (continued)

BIRDS OF THE DIVIDE PLANNING AREA

Birds of the Divide Planning Area
Relative Abundance by Season

V-Verified
H-Hypothetical

A-Abundant
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R-Rare

Species	Special Habitat Features	Xasa Bogr Hill				Chna Bogr Hill				Pied Jumo Hill				Saka Spai Valley				Atca Bogr Valley				Pipo Pied Lava				Pipo Pied Mountain			
		Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W
White-throated Raven		R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R				
Cornus cryptoleucus		H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H				
Black-capped Chickadee	Cavity nester									C	C	C										U	U	U		U	U	U	
Parus atricapillus										V	V	V										H	H	H		H	H	H	
Mountain Chickadee	" "									C	C	C	C									C	C	C		C	C	C	
Purus gambeli										V	V	V	V									V	V	V		V	V	V	
Mexican Chickadee	" "									C	C	C										C	C	C		C	C	C	
Parus sclateri										V	V	V										V	V	V		V	V	V	
Plain Titmouse	" "	C	C	C						C	C	C	C									C	C	C		C	C	C	
Parus inornatus		V	V	H						V	V	V	V									V	V	V		V	V	V	
Common Bushtit		U		U	U					C	C	C										C	C	C		C	C	C	
Psaltriparus minimus		H		H	V					V	V	H										V	V	V		V	V	V	
White-breasted Nuthatch	Cavity nester	U		U	U					C	C	C	C									C	C	C	C	C	C	C	
Sitta carolinensis		V		V	V					V	V	V	V									V	V	V	V	V	V	V	
Red-breasted Nuthatch	" "									C	C	C										C		C	C	C		C	C
Sitta canadensis										V	V	H										V		V	V	V		V	V
Pygmy Nuthatch	" "									U	U	U										U	U	U		U	U	U	
Sitta pygmaea										H	H	H										H	H	H		V	V	V	
Brown Creeper	" "									C		C	C									U		U	U	U		U	U
Certhia familiaris										H		V	V									H		H	H	H		H	H
House Wren	" "									U		U	U									U		U	U	U		U	U
Troglodytes aedon										H		H	H									H		H	H	H		H	H
Bewick's Wren	" "	C	C	C						C	C	C						U	U	U		C	C	C		C	C	C	
Thryomanes bewickii		V	V	V						V	V	V						V	V	H		V	V	V		V	V	V	
Winter Wren	" "	U	U	U						U	U	U																	
Troglodytes troglodytes		H	H	H						H	H	H																	
Canyon Wren										U	U	U										C	C	C		C	C	C	
Catherpes mexicanus										H	H	H										V	V	V		V	V	V	
Rock Wren		C	C	C	C	C	C	C	C	C	C	C	U					U	U	U		C	C	C	C	U	U	U	
Salpinctes obsoletus		V	V	V	V	V	V	V	V	V	V	V	V					V	V	H		V	V	V	V	V	V	H	
Mockingbird		U	U	U		C	C	C		C	C	C		U	U	U		C	C	C									
Mimus polyglottos		V	V	V		V	V	V		V	V	V		V	V	H		V	V	V									
Bendire's Thrasher		U	U	U		U	U	U						U	U	U		U	U	U									
Toxostoma bendirei		V	V	V		V	V	V						V	V	H		H	V	H									
Sage Thrasher		U	U	U		U	U	U										U	U	U									
Oreoscoptes montanus		V	V	V		V	V	V										V	V	V									
Curve-billed Thrasher										U	U	U										U	U	U		U	U	U	
Toxostoma curvirostre										H	H	H										V	V	H		H	H	H	
American Robin		C	C	C						C	C	C	C									C	C	C	C	C	C	C	
Turdus migratorius		V	V	V						V	V	V	V									V	V	V	V	V	V	V	
Townsend's Solitaire		C	C	C						C		C	C									C		C	C	C		C	C
Myadestes townsendi		V	V	V						V		V	V									V		V	V	V		V	V
Hermit Thrush																						U	U	U					
Catharus guttata																						H	V	H					
Swainson's Thrush																		U	U	U									
Catharus ustulata																		H	V	H									
Western Bluebird	Cavity nester	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C		C	C	C	C	C	
Sialia mexicana		V	V	V	V	V	V	H	V	V	V	V	V	V	V	V	V	V	V	V	V	V		V	V	H	V	V	

TABLE D-1 (continued)

BIRDS OF THE DIVIDE PLANNING AREA

Birds of the Divide Planning Area
Relative Abundance by Season

V-Verified
H-Hypothetical

A-Abundant
C-Common
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R-Rare

		Standard Habitat Sites*																											
	Vegetation Type	Xasa Bogr				Chna Bogr				Pied Jumo				Saka Spai				Atca Bogr				Pipo Pied				Pipo Pied			
	Land Form	Hill				Hill				Hill				Valley				Valley				Lava				Mountain			
		Season of Use																											
Species	Special Habitat Features	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W
Common Yellowthroat *Geothlypis trichas*	Stock ponds/Permanent water	U V	U V	U V	U V	U V	U V	U V	U V	U V	U V	U V	U V	U V	U V	U V	U V	U V	U V	U V	U V	U V	U V	U V	U V	U V	U V	U V	U V
Yellow-breasted Chat *Icteria virens*	" "	U V	U V	U V	U V	U V	U V	U V	U V	U V	U V	U V	U V	U V	U V	U V	U V	U V	U V	U V	U V	U V	U V	U V	U V	U V	U V	U V	U V
Red-faced Warbler *Cardellina rubrifrons*										U V	U V	U H										U H	U V	U H		U H	U H	U H	
Painted Redstart *Myioborus pictus*										U H	U H	U H										U H	U H	U H		U H	U H	U H	
House Sparrow *Passer domesticus*		U H	U H	U H		U H	U H	U H		U H	U H	U H		U H	U H	U H		U H	U H	U H		U H	U H	U H		U H	U H	U H	
Eastern Meadowlark *Sturnella magna*		U V	U V	U V		U V	U V	U V		U H	U V	U H		U V	U V	U H		U V	U V	U V									
Western Meadowlark *Sturnella neglecta*		C H	C V	C H		U V	U V	U V		U V	U V	U V		U H	U V	U H		C H	C V	C V									
Yellow-headed BLackbird *Xanthocephalus xanthocephalus*		U V	U V	U H		U V	U V	U V																					
Red-winged Blackbird *Agelaius phoeniceus*	Stock ponds/Permanent water	U H	U V	U H		U V	U V	U H																					
Brewer's Blackbird *Euphagus cyanocephalus*		U V	U V	U V		U V	U V	U V										U V	U V	U V									
Brown-headed Cowbird *Molothrus ater*		U V	U V	U V		U V	U V	U V		U H	U H	U H						U H	U H	U H		U H	U H	U H		U V	U V	U H	
Scott's Oriole *Icterus parisorum*		U V	U V	U H		U V	U V	U V										U V	U V	U H									
Northern Oriole *Icterus galbula*										U V	U V	U H										U V	U V	U H		U V	U V	U H	
Western Tanager *Piranga ludoviciana*										U V	U V	U H										U V	U V	U H		U V	U V	U V	
Hepatic Tanager *Piranga flava*		C V	C V	C H						U V	U V	U H										C V	C V	C H		C V	C V	C V	
Black-headed Grosbeak *Pheucticus melanocephalus*										U V	U V	U H										U H	U V	U H					
Blue Grosbeak *Guiraca caerulea*										U H	U V	U H										U H	U H	U H		U H	U H	U H	
Rose-Breasted Grosbeak *Pheucticus ludovicianus*										U H	U H	U H										U H	U V	U H		U H	U H	U H	
Luzuli Bunting *Passerina amoena*		U H	U H	U H		U H	U H	U H										U H	U H	U H									
Evening Grosbeak *Hesperiphona vespertina*										U H	U H	U H										C V	C V	C H		U H	U H	U H	
Purple Finch *Carpodacus purpureus*						U H		U H	U V	U H		U H	U V									C V		C V	C V	U H	U H	U H	
Cassin's Finch *Carpodacus passinii*										U H	U V	U H	U V									U H	U H	U H	U V	U H	U H	U H	U H
House Finch *Carpodacus mexicanus*										U H		U H	U V									C V	C V	C V		U H	U H	U H	
Pine Grosbeak *Pinicola enucleator*										U H	U H	U H										C V	C V	C H		U H	U H	U H	

TABLE D-1 (continued)

BIRDS OF THE DIVIDE PLANNING AREA

Birds of the Divide Planning Area
Relative Abundance by Season

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Standard Habitat Sites*

Season of Use

Vegetation Type		Xasa Bogr				Chna Bogr				Pied Jumo				Saka Spai				Atca Bogr				Pipo Pied				Pipo Pied			
Land Form		Hill				Hill				Hill				Valley				Valley				Lava				Mountain			
Species	Special Habitat Features	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W
Pine Siskin										C	C	C										U	U	U		U	U	U	
Carduelis pinus											H	V	H										H	H	H		H	H	H
American Goldfinch										U	U	U										U	U	U		U	U	U	
Carduelis tristis										H	V	H										H	H	H		H	H	H	
Lesser Goldfinch										U	U	U														C	C	C	
Carduelis psaltria										V	V	H														V	V	V	
Red Crossbill										U	U	U	U									A	A	A	A	U	U	U	U
Loxia curvirostra										H	H	H	H									V	V	H	V	H	H	H	H
Green-tailed Towhee										U	U	U						C	C	C		U	U	U		U	U	U	
Pipilo chlorurus										V	V	H						V	V	V		H	H	H		H	H	H	
Rufous-sided Towhee										C	C	C	C									U	U	U		C	C	C	
Pipilo erythrophthalmus										V	V	V	V									H	H	H		V	V	V	
Brown Towhee		C	C	C						C	C	C	C	U	U	U						C	C	C	C	U	U	U	U
Pipilo fuscus		V	V	H						V	V	V	V	V	V	V						V	V	H	V	H	H	H	H
Lark Bunting										C	C	C										U	U	U		U	U	U	
Calamospiza melanocorys										V	V	V										H	H	H		H	H	H	
Vesper Sparrow		U	U	U		U	U	U						U	U	U		C	C	C									
Pooecetes gramineus		V	V	H		V	V	V						V	V	V		H	V	V									
Lark Sparrow		U	U	U		U	U	U		U	U	U						C	C	C		U	U	U					
Chondestes grammacus		V	V	V		V	V	V		H	H	H						V	V	V		V	V	H					
Sage Sparrow		U	U	U		U	U	U										U	U	U									
Amphispiza belli		H	H	H		H	H	H										H	H	H									
Dark-eyed Junco		C		C	C	C		C	C	C		C	C									C		C	C	C		C	C
Junco hyemalis		V		V	V	V		V	V	V		V	V									V		V	V	V		V	V
Gray-headed Junco										U		U	U									C		C	C	C	C	C	
Junco caniceps										H		H	V									V		V	V	V	V	V	
Chipping Sparrow		C	C	C		C	C	C		C	C	C		C	C	C		C	C	C		C	C	C		U	U	U	C
Spizella passerina		V	V	H		V	V	V		V	V	V		V	V	V		V	V	V		V	V	V		V	V	V	V
Brewer's Sparrow		C	C	C		C	C	C		C	C	C		C	C	C		A	A	A		U	U	U					
Spizella breweri		V	V	H		V	V	H		V	V	H		V	V	V		V	V	H		V	V	H					
White-crowned Sparrow										U	U	U										C	C	C		U	U	U	
Zonotrichia leucophrys										H	H	H										V	V	V		H	H	H	
Lincoln's Sparrow										R	R	R										R	R	R		R	R	R	
Melospiza lincolnii										H	V	H										H	H	H		H	H	H	
Tree Sparrow										U	U	U										U	U	U		U	U	U	
Spizella arborea										H	H	H										H	H	H		H	H	H	
White-throated Sparrow										U	U	U										U	U	U		U	U	U	
Zonotrichia albicollis										V	V	H										V	V	V		V	V	H	
Song Sparrow		U	U	U		U	U	U										U	U	U									
Melospiza melodia		H	H	H		H	H	H										H	V	H									
Rufous-crowned Sparrow		U	U	U		U	U	U										U	U	U									
Aimophila ruficeps		H	H	H		H	H	H										H	H	H									
Cassin's Sparrow		U	U	U		U	U	U										U	U	U									
Aimophila cassinii		H	H	H		H	H	H										H	H	H									
Baird's Sparrow (SII)		R		R																									
Ammodramus bairdii		V		H																									
McCown's Longspur		U	U	U		U	U	U						U	U	U		U	U	U									
Calcarius McCounii		H	H	H		H	H	H						H	H	H		H	H	H									

TABLE D-1 (continued)

REPTILES OF THE DIVIDE PLANNING AREA

Reptiles of the Divide Planning Area
Relative Abundance by Season

V-Verified
H-Hypothetical

A-Abundant
C-Common
U-Uncommon
R-Rare

	Vegetation Type Land Form	Standard Habitat Sites* Xasa Bogr Hill				Chna Bogr Hill				Pied Jumo Hill				Saka Spai Valley				Atca Bogr Valley				Pipo Pied Lava				Pipo Pied Mountain			
Species	Special Habitat Features	Season of Use Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W
Lesser Earless Lizard *Holbrookia maculata*	Sandy areas	C V	C V			C V	C V							C V	C V			C V	C V										
Greater Earless Lizard *Holbrookia texana*	" "	U H	U H			U H	U H							U H	U H			U H	U H										
Collared Lizard *Crotaphytus collaris*	Rocky hillsides	C V	C V			C V	C V			C V	C V			C V	C V			C V	C V			C V	C V			C V	C V		
Long-nosed Leopard Lizard *Gambelia wizlizenii wizlizenii*														U H	U H			U H	U H										
Crevice Spiny Lizard *Sceloporus poinsetti*										U H	U V			U V	U V			U V	U V										
Desert Spiny Lizard *Sceloporus magister*		U H	U H			U V	U V			U H	U H																		
Eastern Fence Lizard *Sceloporus undulatus*	Fallen timber	A V	A V			A V	A V			A V	A V			A V	A V			A V	A V			A V	A V			A V	A V		
Sagebrush Lizard *Sceloporus graciosus*		C V	C V			C V	C V											U H	U H										
Side-blotched Lizard *Uta stansburiana*		C V	C V			C V	C V			C V	C V			C V	C V			C V	C V			C V	C V			C V	C V		
Tree Lizard *Urosaurus ornatus*	Water									U V	U V											U V	U V			U V	U V		
Texas Horned Lizard *Phrynosoma cornutum*		C H	C H			C H	C H							C H	C H			C H	C H										
Short-horned Lizard *Phrynosoma douglassi*		C V	C H	C H		C V	C V	C H		C V	C H	C H		C H	C V	C V		C H	C H	C V		C H	C V	C H		C H	C H	C H	
Mountain Short Horned Lizard *Phrynosoma douglassi douglassi*						C V	C V	C H		C V	C V	C H		C H	C H	C H		C H	C H	C H		C H	C H	C H		C V	C V	C H	
Round-tailed Horned Lizard *Phrynosoma modestum*						U H	U H	U H		U H	U H	U H						U H	U H	U H									
Great Plains Skink *Eumeces obsoletus*	Moist areas	U H	U H	U H		U H	U H	U H		U H	U H	U H		U H	U H	U H		U H	U H	U H		U H	U H	U H					
Many-lined Skink *Eumeces multivirgatus*	" "	C H	C H	C H		C H	C H	C H		C H	C V	C H		C H	C H	C H		C H	C H	C H		C H	C H	C H					
Plateau Whiptail *Cnemidophorus velox*										C V	C V	C H										C V	C V	C V		C V	C V	C V	
Chihuahua Whiptail *Cnemidophorus exsanguis*						C H	C V	C H		C H	C V	C H		C H	C H	C H		C H	C V	C H		C H	C V	C H		U H	U H	U H	
Western Whiptail *Cnemidophorus tigris*		U H	U H	U H		U H	U H	U H		U H	U H	U H		U H	U H	U H		U H	U H	U H		U H	U H	U H		U H	U H	U H	
Checkered Whiptail *Cnemidophorus tesselatus*		U H	U H	U H		U H	U H	U H		U H	U H	U H																	
Arizona Alligator Lizard *Gerrhonotus kingii*										U	U	U																	
Ringneck Snake *Diadophis punctatus*		U H	U H	U H		U H	U H	U H		U H	U H	U H														U H	U H	U H	
Plains Hognose *Heterodon nasicus*		U H	U H	U H		U H	U H	U H										U H	U H	U H						U H	U H	U H	

TABLE D-1 (continued)

REPTILES OF THE DIVIDE PLANNING AREA

Reptiles of the Divide Planning Area
Relative Abundance by Season

V-Verified
H-Hypothetical

A-Abundant
C-Common
U-Uncommon
R-Rare

Standard Habitat Sites*

Season of Use

	Vegetation Type Land Form	Xasa Bogr Hill				Chna Bogr Hill				Pied Jumo Hill				Saka Spai Valley				Atca Bogr Valley				Pipo Pied Lava				Pipo Pied Mountain			
Species	Special Habitat Features	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W
Desert Striped Whipsnake *Masticophis taeniatus taeniatus*		U H	U H	U H		U H	U H	U H		U H	U H	U H																	
Striped Whipsnake *Masticophis taeniatus*										U H	U H	U H														U H	U H	U H	
Coachwhip *Masticophis flagellum*		C H	C H	C H		C H	C H	C H		U H	U H	U H						C H	C H	C H		C H	C V	C H		U H	U H	U H	
Mountain Patch-nose Snake *Salvadora grahamiae*		C H	C H	C H		C H	C H	C H		C H	C H	C H						C H	C H	C H									
Great Plains Rat Snake *Elaphe guttata emoryi*																										C H	C H	C H	
Painted Desert Glossy Snake *Azizona elegans philipi*		C H	C H	C H		U H	U H	U H		U V	U V	U V						U V	U V	U V									
Gopher Snake *Pituophis melanoleucus*		A V	A V	A V		A V	A V	A V		A V	A V	A V		A V	A V	A V		A V	A V	A V		A V	A V	A V		A V	A V	A V	
Black-necked Garter Snake *Thamnophis cyrtopsis*	Moist areas									C V	C V	C V										C V	C V	C V					
Western Terrestrial Garter Snake *Thamnophis elegans*	" "	C V	C V	C V		C V	C V	C V		U H	U H	U H		C H	C H	C H		C H	C H	C H		U H	U H	U H					
Western Black-necked Garter Snake *Thamnophis cryrtopsis cyrtopsis*		U H	U H	U H		U H	U H	U H		U H	U H	U H																	
Common Garter Snake *Thamnophis sirtalis*		U H	U H	U H		U H	U H	U H		U H	U H	U H																	
Checkered Garter Snake *Thamnophis marcianas*														U H	U H	U H		U V	U V	U H									
Plains Black Headed Snake *Tanilla nigriceps*		U H	U H	U H		U H	U H	U H		U H	U H	U H		U H	U H	U H		U H	U H	U H									
Texas Night Snake *Hypsiglena torquata texana*		U H	U H	U H		U H	U H	U H		U H	U H	U H		U H	U H	U H		U H	U H	U H									
Spotted Night Snake *Hypsiglena torquata ochrorhyncha*		U H	U H	U H		U H	U H	U H		U H	U H	U H		U H	U H	U H		U H	U H	U H									
(S-II)																													
Sonora Mountain Kingsnake *Lampropeltis pyromelana pyromelana*	Mountains									R H	R H	R H														R H	R H	R H	
Sonora Kingsnake *Lampropeltis getulus splendida*						U H	U H	U H										U H	U H	U H									
New Mexican Milk Snake *Lampropeltis triangulum celaemops*										U H	U H	U H																	
Western Hook-nosed Snake *Ficimia cana*		U H	U H	U H		U H	U H	U H		U H	U H	U H		U H	U H	U H		U H	U H	U H									
Black-tailed Rattlesnake *Crotalus molossus*		U H	U V	U H		U H	U H	U H						U H	U H	U H		U H	U H	U H									
Northern Black-tailed Rattlesnake *Crotalus molossus molossus*										U H	U H	U H														U H	U H	U H	

TABLE D-1 (continued)

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Reptiles of the Divide Planning Area
Relative Abundance by Season

V-Verified
H-Hypothetical

A-Abundant
C-Common
U-Uncommon
R-Rare

Standard Habitat Sites*

Season of Use

	Vegetation Type	Xasa Bogr				Chna Bogr				Pied Jumo				Saka Spai				Atca Bogr				Pipo Pied				Pipo Pied			
	Land Form	Hill				Hill				Hill				Valley				Valley				Lava				Mountain			
Species	Special Habitat Features	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W	Sp	Su	F	W
(S-II)																													
Arizona Black Rattlesnake	Mountainous or very									R	R	R														R	R	R	
Crotalus viridis cerberus	rough country									H	H	H														H	H	H	
Prairie Rattlesnake		C	C	C		C	C	C		C	C	C		C	C	C		C	C	C		C	C	C		C	C	C	
Crotalus viridis viridis		V	V	V		V	V	V		V	V	V		V	V	V		V	V	V		V	V	V		V	V	V	
Western Diamondback Rattlesnake										U	U	U														U	U	U	
Crotalus atrox										H	H	H														H	H	H	
Rock Rattlesnake		U	U	U		U	U	U																		U	U	U	
Crotalus lepidus		H	H	H		H	H	H																		H	H	H	

* Xasa/Bogr - Broom Snakeweed/Blue Grama, Hill
Chna/Bogr - Rabbitbrush/Blue Grama, Hill
Pied/Jumo - Pinyon/Juniper, Hill
Saka/Spai - Russian Thistle/Alkali Sacaton, Valley
Atca/Bogr - Four-wing Saltbush/Blue Grama, Valley
Pipo/Pied - Ponderosa Pine/Pinyon Pine, Lava
Pipo/Pied - Ponderosa Pine/Pinyon Pine, Mountain

Source: Findley 1975, Springer 1980 and Hubbard 1978.

APPENDIX E

Livestock Grazing / Management

DEVELOPMENT OF THE PREFERRED ALTERNATIVE AND OTHER ALTERNATIVES

The proposed range management program (Preferred Alternative) was formulated in conjunction with the development of the Divide Planning Area (DPA) multiple land-use plan. The following narrative describes the overall planning process and identifies the steps that have been and will be taken by Bureau of Land Management (BLM) managers in making range management decisions for the DPA.

Resource Inventories - Between late 1977 and early 1980, Socorro District resource specialists conducted inventories and assembled information on ten resource use categories in the DPA. These resource uses included: Lands, Minerals, Forestry and Other Vegetative Products, Range Management, Watershed, Wildlife Habitat, Recreation, Visual Resource Management, Wilderness, and Cultural Resources. These inventories involved field studies, literature searches, and consultation with agencies, organizations, and individuals. The information derived from these inventories provided the data base for developing the DPA multiple land-use plan.

Unit Resource Analysis (URA) - Between late 1979 and June 1980 the BLM Socorro District staff prepared a URA for the DPA. The URA consisted of four sections: Base and location maps; a comprehensive description of the physical characteristics of the DPA; an analysis and recordation of the current uses, problems, productivity, trend, and quality of each of the ten resource categories; and an analysis and documentation of all technologically feasible management opportunities to improve, enhance or protect the use, production, trend and quality of each of the ten resource uses.

Planning Area Analysis (PAA) - BLM Socorro District resource specialists compiled and analyzed current social, economic, institutional and other environmental factors. This information was used to prepare the PAA for the DPA and was completed in late 1980.

Management Framework Plan (MFP) - In its final form, the MFP will be BLM's multiple land-use plan for the DPA. Preparation of the MFP consists of three phases: Step 1 of the MFP was prepared between November 1980 and January 1981. During preparation of this step, resource specialists representing each of the ten resource uses condensed and presented management objectives from the URA and supporting rationale. Step 2 of the MFP consisted of the San Augustine Resource Area (SARA) Manager and a team of specialists analyzing public comment received, the social, economic, institutional, and environmental impacts of each resource activity objective and the interrelationships between each resource activity objective. Competing resource activity objectives were then reconciled or coordinated. If competing resource activity objectives were unreconcilable, alternatives were formulated to prevent, mitigate or compensate for potential environmental impact. This step was completed in August 1981 and has served as the basis for development of the alternatives for this Environmental Impact Statement (EIS). Resource activities that conflict with range management are further analyzed in this EIS and the environmental effects are discussed in Chapter III. Completion of Step 3 of the MFP will occur when the BLM

Socorro District Manager, in conjunction with the New Mexico BLM State Director, makes a decision on the multiple land-use resource activity objectives. This decision will constitute the multiple land-use plan for the DPA. Decisions on the proposed range management program (MFP Step 3) will be made and issued in accordance with the schedule illustrated in conjunction with the Preferred Alternative. The completed planning documents will be permanently retained in the BLM Socorro District Planning/EIS files and are available to the public at 198 Neel Avenue, Socorro, New Mexico 87801.

During development of the aforementioned multiple land-use plan, the BLM Socorro District analyzed its current range management program. Considered in this analysis were current BLM policies and procedures, philosophical changes in the art of range management, legislative requirements, problems encountered in other range management areas and projected fiscal capabilities. The BLM Socorro District decided that through using the range program analysis, the District would formulate a new range management program for utilization in the DPA planning process, which would complement and enhance BLM policies and procedures, improve the vegetative resource, remain within the intent of existing laws and regulations, be multiple-use oriented, and be efficient in time and tax dollar expenditures (Eshelman 1981). During the aforementioned inventory, consensus dictated that the causes of any declining or poor range condition and the resolutions of these causes should be the primary driving force in the development of a range management program. To assess range condition, the BLM Socorro District considered range condition classes as a range of values occurring between 0 and 100; with 0-25 as poor, 26-50 fair, 51-75 good, and 76-100 excellent. The District arbitrarily took the midpoint of each range condition class (poor - 12.5; fair - 37.5; good - 62.5; excellent - 87.5) and multiplied it times the number of allotment acres found in the respective range condition class. All range condition data was obtained using the Soil-Vegetation Inventory Method (SVIM) during the inventories of 1978-79 (BLM Socorro District Planning/EIS files). The methodology was based on the ecological range condition [Soil Conservation Service (SCS) Range Site] technique. The values were summed and then divided by the total condition acres (non-range site acres were not included) to yield the average allotment condition. Public land average range condition was obtained by the same procedure except that public land figures were used, rather than total allotment figures.

An example of this computation is:

Allotment A	Poor	Fair	Good	Excellent	Total
Total Acres	212 X 12.5	3,219 X 37.5	3,722 X 62.5	516 X 87.5	7,669
	2,650.0	120,712.5	232,625.0	45,150.0	401,137.5

401,137.5 ÷ 7,669 = 52.31 allotment average condition (good).

Allotment B	Poor	Fair	Good	Excellent	Total
Total Acres	516	3,722	3,219	212	7,669
	X 12.5	X 37.5	X 62.5	X 87.5	
	6,450.0	139,575.0	201,187.5	18,550.0	365,762.5

365,762.5 ÷ 7,669 = 47.69 public land average condition (fair).

During development of the DPA URA, a flow chart (Figure E-1) was devised that would allow allotment categorization based on range condition and acreage of public land within an allotment. Six management categories were then created to correspond to specific management needs, relative to range conditions and other administrative constraints. Using the fundamental principles of range management, management actions were assigned to each management category. Each action was listed in a priority sequence. Some management actions would be required, others optional. Within the range management program, the BLM Socorro District based the majority of the actions on one of the first principles of range management - that there are four basic ways to manage livestock grazing: season-of-use, distribution, kind and class of livestock, and numbers of livestock (Herbel et al. 1974; Hormay 1956). It was recognized that any one, or a combination of these ways, in conjunction with rangeland improvements and "careful and considered consultation, cooperation and coordination with the lessees, permittees, and landowners involved" [as required by Section 8 of the Public Rangelands Improvement Act of 1978 (PRIA) P.L. 95-514] would be the most timely and efficient management action(s) to improve range conditions, relative to the current range condition on any range management unit. In addition, the BLM Socorro District has expanded this philosophy to welcome the participation of any other Federal, State, or local agency, other organization, or individual to participate in the PRIA Section 8 consultation process.

All 187 allotments within the DPA were then placed in one of the six management categories (described in the Preferred Alternative), depending on range condition and acreage of public land within the allotment. The Step 1 MFP (described above) for Range Management recommended that management be implemented on all allotments by category utilizing the management actions (described in the Preferred Alternative) of each category.

Step 2 of the MFP (the Multiple-Use Analysis Process) identified obvious resource-use conflicts between the Range Management MFP 1 recommendation, Wildlife Habitat, and Watershed. As a result of the Multiple-Use Analysis Process, 16 grazing allotments that had been placed in Management Category F were moved to Category D. Due to this action, watersheds in critical erosion condition (as determined by Soil Surface Factors in the Phase I watershed inventories) and wildlife habitat will receive management support from livestock grazing practices in order to achieve optimum resource protection and production. The result of Step 2 of the MFP, Multiple-Use Analysis, has served as the basis for development of the Preferred Alternative.

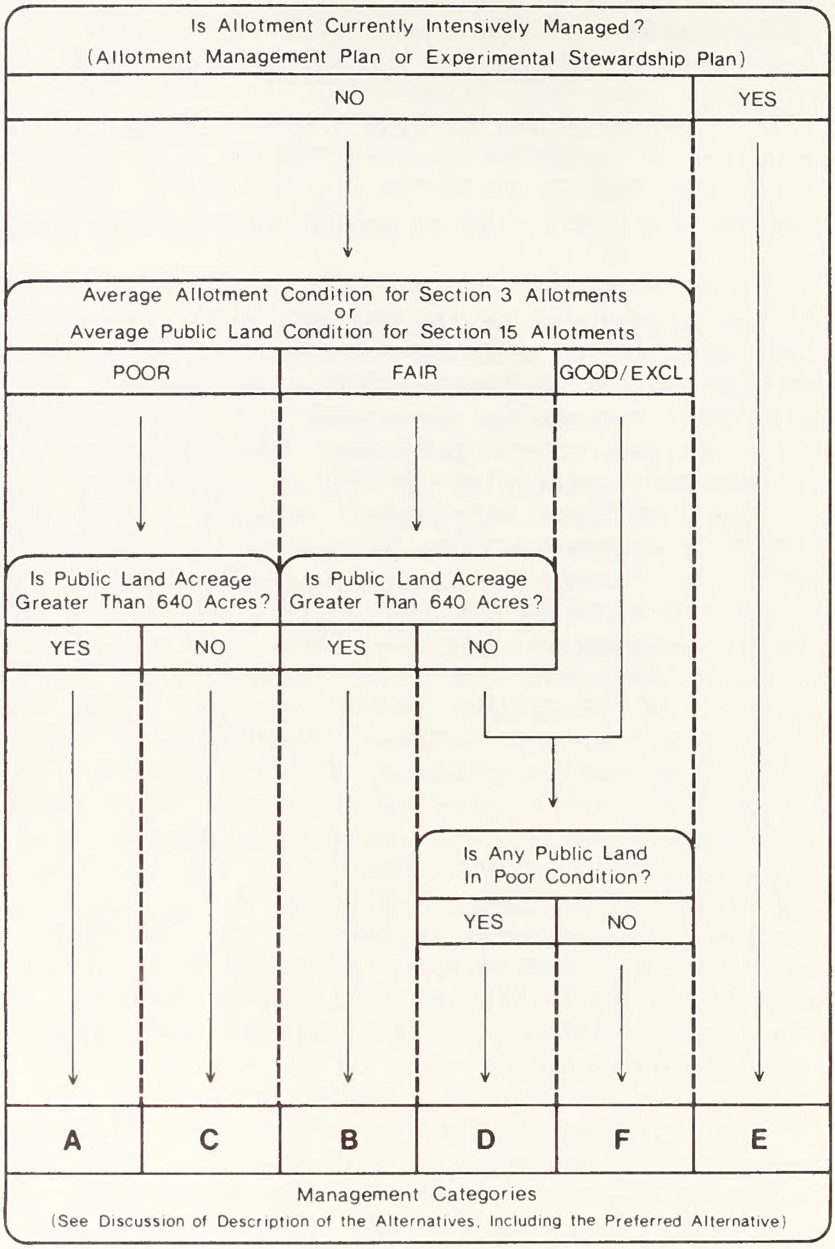
Is Allotment Currently Intensively Managed?
(Allotment Management Plan or Experimental Stewardship Plan)
NO
YES
Average Allotment Condition for Section 3 Allotments
or
Average Public Land Condition for Section 15 Allotments
POOR
FAIR
GOOD/EXCL
Is Public Land Acreage Greater Than 640 Acres?
YES
NO
Is Public Land Acreage Greater Than 640 Acres?
YES
NO
Is Any Public Land In Poor Condition?
YES
NO
A
C
B
D
F
E
Management Categories
(See Discussion of Description of the Alternatives, Including the Preferred Alternative)

FIGURE E-1. **Allotment Management Categorization**

MANAGEMENT CATEGORIES AND MANAGEMENT ACTIONS

Management Category A

The criteria for placing allotments in this management category were that there are more than 640 acres of public land in the allotment and the average range condition for the allotment is poor. The following management actions listed in order of priority, would be implemented on allotments in this management category:

1) Adjust Numbers of Livestock (Required Action) - Allotments in this category, by the nature of the average/poor range condition rating, would require immediate management attention. Adjusting numbers of livestock would be a required management action in order to reduce utilization pressure.

2) Season-of-Use Management (Required Action) - A minimum 12-month continuous rest would be required for each pasture within every 48-months following the effective date of the final decision, to begin no later than 24 months following the date of the final decision. This management action would allow the forage species to replenish the root reserves and meet vegetative needs; it would allow flexibility in developing a grazing system. Utilization of the key forage species would be limited to 50 percent of the current year's production, ensuring the maintenance of vegetative health. Greater than 50-percent utilization could be authorized as a management tool.

3) Distribution Management (Optional Action) - Distribution management would be an optional management action and would be implemented if it is determined during the consultation process that it would improve range condition in addition to adjusting livestock numbers and implementing season-of-use management. This management action consists of developing rangeland improvements and requires salt and/or a supplement. Construction of rangeland improvements such as fences and additional waters would relieve grazing pressure on over-utilized areas and would increase grazing on under-utilized areas.

The salt and/or supplement placement recommendation is that salt and/or a supplement shall be placed no closer than one-fourth mile from water on public lands the first and second years following the effective date of the final grazing decision, and no closer than one-half mile from water the third and fourth years following the same date. The salt and/or supplement recommendation would be implemented if it is shown during the consultation process that it would be an effective distribution tool to improve range management and range condition alleviating livestock concentration around livestock waters (MFP Step II).

4) Change in Class or Kind of Livestock (Optional Action) - This would be an optional management action and would be implemented if it is shown during the consultation process that a change in class or kind of livestock would be needed to improve range condition.

Management Category B

The criteria for placing allotments in this category were that there are more than 640 acres of public land and the average range condition for the allotment is fair. The following management actions are discussed in order of priority for implementation on allotments in this category. The allotments in an average fair range condition would require intensive management; however, the priority sequence of management actions varies from those in Management Category A.

1) Season-of-Use Management (Required Action) - This management action would require implementing a minimum of one spring (4/1 - 6/30), one summer (7/1 - 9/30), and one fall (10/1 - 11/30) deferment for each pasture within every 48-months following the final grazing decision.

The minimum requirement would allow greater flexibility during the consultation process to develop a grazing system. Modification of the deferment requirement, plus or minus 15 days, would allow for greater flexibility in livestock movement based upon phenological studies of the key forage species.

Utilization of the key forage species would be limited to 50 percent of the current year's production ensuring the maintenance of vegetative health. Greater than 50-percent utilization could be authorized as a management tool.

2) Distribution Management (Required Action) - This would be a required management action to develop rangeland improvements as necessary for implementing season-of-use management and improving utilization patterns. Implementation of the salt and/or supplement requirement would be dependent upon the consultation process.

3) Adjust Numbers of Livestock (Optional Action) - Allotments in Management Category B are in an average fair range condition due to lack of species diversity resulting from season-of-use and distribution problems, rather than long-term forage production problems, which are a result of livestock numbers. This management action would be initiated if: a) It is found that the consultation parties could not agree on season-of-use and distribution management; b) The consultation parties agreed that an adjustment in numbers would be needed in addition to season-of-use and distribution management to improve range condition; or c) It was determined through range monitoring studies that an adjustment in numbers would be needed in addition to other management actions to improve range conditions.

4) Change in Class or Kind of Livestock (Optional Action) - This management action would be implemented if, during the consultation process, it was determined that change in class or kind of livestock would improve range management and range conditions.

Management Category C

The criteria for placing allotments in this category were that there are less than 640 acres of public land and the average range condition of the allotment is poor. This management category was created to provide a management scheme for small allotments with public lands in poor range condition.

The following management actions, listed in priority order, would be implemented on allotments in this category.

1) Season-of-Use Management (Required Action) - This management action would require implementing a minimum of one spring (4/1 - 6/30), one summer (7/1 - 9/30), one fall (10/1 - 11/30) deferment for each pasture within every 48-months following the final grazing decision.

The minimum deferment requirement would also allow greater flexibility during the consultation process to develop a grazing system. Modification of the deferment requirements, plus or minus 15 days, would allow for greater flexibility in livestock movement dates based upon phenological studies of the key forage species.

Utilization of the key forage species would be limited to 50 percent of the current year's production ensuring the maintenance of vegetative health. Greater than 50-percent utilization could be authorized as a management tool.

2) Distribution Management (Required Action) - This would be a required management action to develop rangeland improvements as necessary for implementing season-of-use management and improving utilization patterns. Implementation of the salt and/or supplement requirement would be dependent upon the consultation process.

3) Adjust Numbers of Livestock (Optional Action) - Allotments in Management Category C are in an average poor range condition due to lack of species diversity resulting from season-of-use and distribution problems, rather than long-term forage production problems, which are a result of livestock numbers. This management action would be initiated if: a) It is found that the consultation parties could not agree on season-of-use and distribution management; b) The consultation parties agreed that an adjustment in numbers would be needed in addition to season-of-use and distribution management to improve range condition; or c) It was determined through range monitoring studies that an adjustment in numbers would be needed in addition to other management actions to improve range conditions.

4) Change in Class or Kind of Livestock (Optional Action) - This management action would be implemented if, during the consultation process, it was determined that change in class or kind of livestock would improve range management and range conditions.

5) Exclusion of Public Lands from Private and State Lands (Optional Action) - It may be shown during the consultation process that excluding public lands from private and State lands by fencing would be beneficial to public land resources or would achieve land-use plan objectives.

Management Category D

The criteria for placing allotments in this category were: some public lands in poor range condition, although the average range condition of the allotment is in good or excellent condition; there are less than 640 acres of public land in the allotment with some public land in poor range condition; and the average range condition of the allotment is fair. The poor range condition of some public land in these allotments occurs in a pasture or pastures and is related directly to a distribution or season-of-use problem.

There are 16 allotments in this management category where all or a portion of the allotment occurs in mule deer habitat, antelope habitat, or critical watershed areas as determined by Soil Surface Factors in the Phase I watershed inventories (See Development of Alternative 1). Management would be implemented on the pasture or pastures that exhibited poor range condition, mule deer habitat, antelope habitat, or contained a critical watershed area.

The following management actions, listed in priority order, would be implemented on allotments in this category:

1) Distribution Management (Required Action) - This management action would require the development of rangeland improvements or initiating the salt and/or supplement recommendation to improve utilization patterns and range condition in the pasture or pastures.

2) Season-of-Use Management (Required Action) - Season-of-use management would be implemented on those pastures with public land in poor range condition. This would consist of one spring deferment (4/1 - 6/30), one summer deferment (7/1 - 9/30), and one fall deferment (10/1 - 11/30) in every 48-months following the effective date of the final decision. Those pastures or allotments occurring in mule deer and antelope habitat would have grazing systems designed to minimize the dietary overlap between livestock and mule deer or livestock and antelope. Those pastures or allotments in critical watershed areas would have grazing systems designed to complement watershed treatments.

Management Category E

This category consists of those allotments currently under intensive management; i.e., AMPs and ESPs. The AMPs in this category have had range monitoring studies established over a 10- to 14-year period. The ESP was implemented in 1981. The allotments in this category have had season-of-use and distribution management implemented, and any future management actions or changes in management actions would be based upon results of monitoring studies. The extent of management changes (if any) would be determined during the consultation process.

Management Category F

This category consists of allotments in average range condition of good/excellent with no public lands in poor condition; or those allotments whose average condition is fair with less than 640 acres public land and no public land in poor range condition. Intensive management would not be implemented on these allotments unless requested by the livestock operator. The need for rangeland improvements to improve range management would be determined during the consultation process as an optional management action.

TABLE E-1

PROPOSED LIVESTOCK RANGELAND IMPROVEMENTS[1/]

Allotment Number	Fences (Miles)	Pipelines (Miles)	Wells	Pit Tanks
MANAGEMENT CATEGORY B				
0109		1.50		
0112		0.50		
0031		1.00		
0110				
0116				
0126	4.25	4.50		
0010				
0012				
0151	0.50			
0022				
0165				
0083				
0111				
0064				
0071				
0094	1.50			
0051				
0181	2.00			2
0009				
0084	1.00	0.50		
0037		0.50		
0150				
0001				
0003		1.50		
0149				
0099		1.00		
0145		2.00		
0093				
0136	0.50			
0030			1	
0021				
0013		2.50	1	
0017			well facility	
0108		1.00		
0078				
0088				
0063		1.50		
0011	4.00	3.00	1	4
0032	2.00	4.50	1	
0026				

TABLE E-1 (Continued)

PROPOSED LIVESTOCK RANGELAND IMPROVEMENTS[1/]

Allotment Number	Fences (Miles)	Pipelines (Miles)	Wells	Pit Tanks
0058				
0066				
0152	3.50			1
0025				
0005			1	3
0008				
0060				
0089				
0101		5.50	1	4
0073				
0174				
0018	2.00			
0119				
0106				
0183				
0190				
0069				
0029		1.75		
0068				
0090	1.00	2.00		
0176				2
0059				
0054				
0048				
0172				
0082				
0055				
0163	4.00		1	
0169	4.00			1
0194		2.50		
0102				
0121				
0107		5.00		
0135				
TOTAL	30.25	42.25	6 1 well facility	17
MANAGEMENT CATEGORY D				
0098				
0156		1.00		1
0180				
0133				
0024				

TABLE E-1 (Continued)

PROPOSED LIVESTOCK RANGELAND IMPROVEMENTS[1]

Allotment Number	Fences (Miles)	Pipelines (Miles)	Wells	Pit Tanks
0040				
0171				
0188				
0159	3.00	4.00	1	
0076				
0161			1	
0057				
0096	2.00	1.50		
0044		2.00		
0035				
0154		3.00		
0160				
0043				
0065				
0053				
0081		1.00		1
0056				
0079				
TOTAL	5.00	12.50	2	2
MANAGEMENT CATEGORY E				
0046		Replace 3 Drinkers		
0115				
0047				
0038				
0023				
0007				
0087		1.50		1
0034				
0092				
0028				2
0148				
0050	1.50	1 Storage		
0070				
0072		1.50		
TOTAL	1.50	3.00 3 Drinkers 1 Storage Tank		3

TABLE E-1 (Continued)

PROPOSED LIVESTOCK RANGELAND IMPROVEMENTS[1/]

Allotment Number	Fences (Miles)	Pipelines (Miles)	Wells	Pit Tanks
MANAGEMENT CATEGORY F				
0097				
0020				
0147				
0033	2.50			
0074				
0113				
0168				
0173				
0080				
0061				
0095				
0114				1
0104				
0192				
0128				
0105				
0184				
0118				
0049				
0141				
0142				
0014				
0162				
0155				2
0125				
0143				
0015	1.50			
0039				
0182				
0067		1.00		
0153				
0158				1
0187				
0179	0.50			1
0120				
0062		0.50		
0132				
0166				
0167				
0157				
0117				
0123				
0085				
0103				

TABLE E-1 (Continued)

PROPOSED LIVESTOCK RANGELAND IMPROVEMENTS[1/]

Allotment Number	Fences (Miles)	Pipelines (Miles)	Wells	Pit Tanks
0004				
0006				
0100	2.50	2.00		
0027		1.00		
0189				
0077				
0019				
0036		1.50		
0041	0.50	1.50		
0170	2.00		1	
0045				
0075				
0127				
0175				
0138				
0193				
0140				
0185				
0146				
0177				
0178				
0137				
0144				
0042				
0186				
0091				
0139				
0164				
0124				
0002				
0086				
0130				
TOTAL	9.50	7.50	1	5

[1/] Tentative rangeland improvements based upon contacts with allottees. Used for analysis purposes only.

Source: BLM Socorro District Planning/EIS Files.

TABLE E-2
ALLOTMENTS, LAND STATUS, ACREAGE, AND RANGE CONDITION
BY MANAGEMENT CATEGORY

		LAND STATUS ACRES																	
		FEDERAL						STATE						PRIVATE					
MGT CAT	ALLOT NO.	EXCEL	GOOD	FAIR	POOR	NON RG	SUB TOTAL	EXCEL	GOOD	FAIR	POOR	NON RG	SUB TOTAL	EXCEL	GOOD	FAIR	POOR	NON RG	SUB TOTAL	ALLOT TOTAL
B	0001	0	0	759	0	0	759	0	0	0	0	0	0	0	0	2,359	0	0	2,359	3,118
	0003	0	0	640	0	0	640	0	0	160	0	0	160	0	0	801	0	0	801	1,601
	0005	0	0	1,453	0	0	1,453	0	149	543	0	0	692	0	678	1,564	0	0	2,242	4,387
	0008	0	1,069	2,471	0	0	3,540	0	300	178	0	0	478	0	330	4,273	0	0	4,603	8,621
	0009	0	0	2,071	0	0	2,071	0	0	0	0	0	0	0	0	1,394	0	0	1,394	3,465
	0010	0	81	12,238	1,181	0	13,500	0	61	6,102	199	1	6,363	0	1	3,722	309	33	4,065	23,928
	0011	0	597	8,332	0	0	8,929	0	351	1,006	0	0	1,357	0	535	1,487	0	0	2,022	12,308
	0012	0	0	836	16	0	852	0	0	909	37	0	946	0	0	14	0	0	14	1,812
	0013	0	0	1,508	0	0	1,508	0	0	0	0	0	0	0	0	0	0	0	0	1,508
	0017	0	8	1,469	0	0	1,477	0	7	633	0	0	640	0	423	2,272	0	0	2,695	4,812
	0018	0	1,821	4,448	33	0	6,302	0	634	1,284	6	0	1,924	0	523	2,535	191	0	3,249	11,475
	0021	0	495	4,276	0	0	4,771	0	0	625	0	0	625	0	34	2,651	0	0	2,685	8,081
	0022	0	16	2,836	28	0	2,880	0	88	2,931	229	0	3,248	0	3	6,238	175	0	6,416	12,544
	0025	0	1,234	5,019	0	0	6,253	0	51	946	0	0	997	0	567	2,309	0	0	2,876	10,126
	0026	0	201	2,340	0	0	2,541	0	0	0	0	0	0	0	0	0	0	0	0	2,541
	0029	0	1,345	4,128	0	0	5,473	0	642	1,161	0	0	1,803	0	73	373	0	0	446	7,722
	0030	0	222	3,637	0	0	3,859	0	0	756	0	0	756	0	46	200	0	0	246	4,861
	0031	0	144	435	124	0	703	0	155	293	184	0	632	0	11	244	425	0	680	2,015
	0032	0	4,419	26,018	0	0	30,437	0	0	0	0	0	0	0	0	0	0	0	0	30,437
	0037	0	0	961	0	0	961	0	0	0	0	0	0	0	0	0	0	0	0	961
	0048	0	2,842	2,395	65	0	5,302	0	844	1,825	0	0	2,669	0	1,191	2,816	128	0	4,135	12,106
	0051	0	0	5,943	0	0	5,943	0	0	2,083	0	0	2,083	0	0	4,527	0	0	4,527	12,553
	0054	0	15,253	22,226	574	0	38,053	0	0	0	0	0	0	0	0	0	0	0	0	38,053
	0055	0	1,769	1,840	0	0	3,609	81	449	1,225	0	0	1,755	29	125	470	0	0	624	5,988
	0058	0	2,392	21,310	632	0	24,334	0	2,285	9,820	0	0	12,105	0	2,803	6,632	0	0	9,435	45,874
	0059	0	461	819	0	0	1,280	0	0	0	0	0	0	0	0	0	0	0	0	1,280
	0060	0	838	1,286	0	0	2,124	0	0	0	0	0	0	0	0	495	0	0	495	2,619
	0063	0	2,646	4,727	115	0	7,488	0	0	4,010	111	0	4,121	0	35	8,790	33	0	8,858	20,467

TABLE E-2
ALLOTMENTS, LAND STATUS, ACREAGE, AND RANGE CONDITION
BY MANAGEMENT CATEGORY

LAND STATUS ACRES

MGT	ALLOT	FEDERAL					SUB	STATE					SUB	PRIVATE					SUB	ALLOT
CAT	NO.	EXCEL	GOOD	FAIR	POOR	NON RG	TOTAL	EXCEL	GOOD	FAIR	POOR	NON RG	TOTAL	EXCEL	GOOD	FAIR	POOR	NON RG	TOTAL	TOTAL
R	0064	0	0	4,325	43	0	4,368	0	0	640	0	0	640	0	0	1,313	0	0	1,313	6,321
	0066	0	273	1,782	0	24	2,079	0	506	2,683	0	0	3,189	0	961	4,182	0	0	5,143	10,411
	0068	0	317	1,804	0	0	2,121	0	44	120	0	0	164	0	508	452	0	0	960	3,245
	0069	0	1,037	1,798	0	351	3,186	0	262	1,171	0	7	1,440	0	2,870	8,556	0	213	11,639	16,265
	0071	0	0	1,867	0	0	1,867	0	0	2,556	80	5	2,641	0	0	8,717	4	24	8,745	13,253
	0073	0	553	502	0	0	1,055	0	0	0	0	0	0	0	26	1,474	0	0	1,500	2,555
	0078	15	1,691	8,802	660	3,316	14,484	0	0	0	0	0	0	0	0	0	0	0	0	14,484
	0082	0	1,198	0	486	0	1,684	0	0	0	0	0	0	0	0	0	0	0	0	1,684
	0083	0	0	1,144	0	0	1,144	0	0	2,131	15	0	2,146	0	0	2,411	163	0	2,574	5,864
	0084	0	0	994	0	0	994	0	0	321	0	0	321	0	0	593	0	0	593	1,908
	0088	0	24	4,454	0	0	4,478	0	40	1,342	0	0	1,382	0	1,246	4,577	0	10	5,833	11,693
	0089	0	0	213	0	0	213	0	0	0	0	0	0	0	0	1,028	0	0	1,028	1,241
	0090	0	31	285	0	0	316	0	0	0	0	0	0	0	244	394	0	0	638	954
	0093	0	0	4,550	118	0	4,668	0	422	2,760	0	0	3,182	0	0	1,481	0	0	1,481	9,331
	0094	0	0	9,295	0	0	9,295	0	0	1,908	0	0	1,908	0	0	605	0	0	605	11,808
	0099	0	10	2,776	0	0	2,786	0	0	0	0	0	0	0	44	1,062	0	0	1,106	3,892
	0101	0	4,062	12,236	0	0	16,298	0	23	2,566	0	0	2,589	0	601	1,734	0	0	2,335	21,222
	0102	0	1,862	3,078	23	2	4,965	0	3,164	2,628	352	191	6,335	0	2,904	919	444	229	4,496	15,796
	0106	0	180	1,340	0	7,912	9,432	0	0	0	0	0	0	0	371	242	0	192	805	10,237
	0107	0	5,155	4,363	0	0	9,518	0	3,696	3,302	0	0	6,998	0	1,524	2,365	0	0	3,889	20,405
	0108	0	0	646	0	0	646	0	0	640	0	0	640	0	167	498	0	0	665	1,951
	0109	0	0	2,878	1,710	0	4,588	0	0	462	601	0	1,063	0	0	79	112	0	191	5,842
	0110	0	0	3,240	635	0	3,875	0	0	450	59	0	509	0	0	3,171	115	0	3,286	7,670
	0111	0	0	2,417	75	0	2,492	0	0	1,561	0	0	1,561	0	34	4,339	190	0	4,563	8,616
	0112	0	0	1,420	0	0	1,420	0	0	8	632	0	640	0	0	5,856	2,039	0	7,895	9,955
	0116	0	0	3,044	0	0	3,044	0	0	640	0	0	640	0	0	3,704	648	0	4,352	8,036
	0119	0	804	1,447	0	0	2,251	0	0	0	0	0	0	0	4	947	0	0	951	3,202
	0121	0	72	88	0	0	160	0	0	0	0	0	0	0	0	0	0	0	0	160
	0126	0	287	10,566	736	0	11,589	0	475	8,098	1,938	0	10,511	0	5	7,917	437	0	8,359	30,459

TABLE E-2
ALLOTMENTS, LAND STATUS, ACREAGE, AND RANGE CONDITION
BY MANAGEMENT CATEGORY

LAND STATUS ACRES

MGT	ALLOT			FEDERAL			SUB			STATE			SUB			PRIVATE			SUB	ALLOT
CAT	NO.	EXCEL	GOOD	FAIR	POOR	NON RG	TOTAL	EXCEL	GOOD	FAIR	POOR	NON RG	TOTAL	EXCEL	GOOD	FAIR	POOR	NON RG	TOTAL	TOTAL
B	0135	0	152	902	0	0	1,054	0	0	0	0	0	0	0	0	0	0	0	0	1,054
	0136	0	273	5,198	0	0	5,471	0	101	1,744	0	0	1,845	0	298	4,924	0	0	5,222	12,538
	0145	0	40	1,699	0	0	1,739	0	0	0	0	0	0	0	0	0	0	0	0	1,739
	0149	0	0	640	0	0	640	0	0	0	0	0	0	0	0	0	0	0	0	640
	0150	0	0	960	0	0	960	0	0	0	0	0	0	0	0	0	0	0	0	960
	0151	0	0	1,066	0	0	1,066	0	0	0	0	0	0	0	0	553	87	0	640	1,706
	0152	0	14	146	0	0	160	0	0	120	0	0	120	0	0	40	0	0	40	320
	0163	0	2,307	2,432	0	7,573	12,312	0	301	1,077	0	1,001	2,379	0	4,436	5,147	0	3,979	13,562	28,253
	0165	0	0	2,256	139	0	2,395	0	0	0	0	0	0	0	0	135	0	0	135	2,530
	0169	0	883	1,044	0	0	1,927	0	0	0	0	0	0	0	0	0	0	0	0	1,927
	0172	0	605	883	0	0	1,488	0	0	0	0	0	0	0	0	0	0	0	0	1,488
	0174	371	859	5,500	0	0	6,730	0	0	0	0	0	0	0	0	0	0	0	0	6,730
	0176	0	745	1,977	0	0	2,722	0	0	0	0	0	0	0	0	0	0	0	0	2,722
	0181	0	0	2,560	0	0	2,560	0	0	0	0	0	0	0	0	0	0	0	0	2,560
	0183	0	391	1,103	0	0	1,494	0	0	0	0	0	0	0	0	0	0	0	0	1,494
	0190	0	461	1,299	0	0	1,760	0	0	0	0	0	0	0	0	0	0	0	0	1,760
	0194	0	1,582	719	0	0	2,301	0	0	280	0	0	280	0	64	924	0	0	988	3,569
D	0024	1,028	3,974	7,096	0	0	12,098	17	64	576	0	0	657	773	4,972	5,080	0	0	10,825	23,580
	0035	0	2,538	1,155	0	0	3,693	0	776	154	0	0	930	0	2,599	1,152	0	0	3,751	8,374
	0040	0	12	148	0	0	160	0	0	0	0	0	0	0	0	0	0	0	0	160
	0043	43	20,295	2,942	0	0	23,280	382	4,140	1,864	0	0	6,386	428	15,019	3,725	0	0	19,172	48,838
	0044	0	3,298	1,498	0	0	4,796	0	784	146	0	0	930	0	104	208	0	0	312	6,038
	0053	0	9,743	372	0	0	10,115	0	2,248	210	0	0	2,458	0	234	12	0	0	246	12,819
	0056	124	17,776	101	0	0	18,001	553	9,527	403	0	0	10,483	553	3,749	46	0	0	4,348	32,832
	0057	0	9,960	515	0	0	10,475	0	3,980	1,397	0	0	5,377	0	4,943	599	0	0	5,542	21,394
	0065	0	200	10	0	0	210	0	0	0	0	0	0	0	0	0	0	0	0	210
	0076	0	68,880	17,541	0	26,342	112,763	0	3,246	4,085	0	4,279	11,610	0	46,533	36,304	0	14,493	97,330	221,703
	0079	311	9,697	917	0	211	11,136	0	1,235	0	0	64	1,299	52	1,623	0	0	15	1,690	14,125
	0081	0	8,204	2,449	0	0	10,653	0	0	0	0	0	0	0	0	0	0	0	0	10,653

TABLE E-2
ALLOTMENTS, LAND STATUS, ACREAGE, AND RANGE CONDITION
BY MANAGEMENT CATEGORY

LAND STATUS ACRES

MGT CAT	ALLOT NO.	FEDERAL						STATE						PRIVATE						ALLOT
		EXCEL	GOOD	FAIR	POOR	NON RG	SUB TOTAL	EXCEL	GOOD	FAIR	POOR	NON RG	SUB TOTAL	EXCEL	GOOD	FAIR	POOR	NON RG	SUB TOTAL	TOTAL
D	0096	0	4,139	1,471	0	0	5,610	0	1,591	938	0	0	2,529	0	0	40	0	0	40	8,179
	0098	0	0	376	64	0	440	0	0	0	0	0	0	0	0	791	0	0	791	1,231
	0133	0	2,234	605	38	0	2,877	0	0	0	0	0	0	0	0	0	0	0	0	2,877
	0154	0	7,736	396	0	3,098	11,230	0	523	0	0	176	699	0	3,567	74	0	585	4,226	16,155
	0156	0	1,479	342	61	295	2,177	0	508	0	0	122	630	0	529	50	485	73	1,137	3,944
	0159	0	12,252	1,661	0	0	13,913	0	1,934	0	0	0	1,934	0	1,545	385	0	0	1,930	17,777
	0160	0	12,736	4,108	0	5,170	22,014	0	1,708	1,285	0	916	3,909	0	6,526	2,378	0	5,831	14,735	40,658
	0161	0	14,926	3,743	0	0	18,669	0	2,334	632	0	0	2,966	0	229	864	0	0	1,093	22,728
	0171	0	8,070	0	0	375	8,445	0	0	0	0	0	0	0	0	0	0	0	0	8,445
	0180	0	638	54	108	0	800	0	0	0	0	0	0	0	0	0	0	0	0	800
	0188	0	2,083	515	0	0	2,598	0	0	0	0	0	0	0	0	0	0	0	0	2,598
E	0007	0	8	993	12	0	1,013	0	0	0	0	0	0	0	563	1,293	76	8	1,940	2,953
	0023	0	1,621	10,030	203	0	11,854	0	248	2,749	35	0	3,032	0	515	1,223	26	0	1,764	16,650
	0028	0	10,277	10,722	0	0	20,999	0	3,838	8,238	75	0	12,151	0	2,129	2,810	6	0	4,945	38,095
	0034	0	191	414	0	0	605	0	0	0	0	0	0	0	138	517	0	0	655	1,260
	0038	0	797	9,520	0	0	10,317	0	569	3,184	0	0	3,753	0	355	2,284	0	0	2,639	16,709
	0046	0	0	6,781	641	0	7,422	0	0	52	0	0	52	0	0	626	61	0	687	8,161
	0047	0	0	8,201	0	0	8,201	0	0	40	0	0	40	0	0	1,639	42	0	1,681	9,922
	0050	0	3,539	1,688	31	0	5,258	0	370	0	0	0	370	0	553	407	0	0	960	6,588
	0070	0	54,484	23,231	344	1,226	79,285	0	830	666	89	6	1,591	0	12,093	6,000	20	1	18,114	98,990
	0072	0	10,192	4,107	0	0	14,299	0	8,666	461	0	0	9,127	0	7,972	1,214	0	0	9,186	32,612
	0087	0	5,776	22,272	0	6,633	34,681	0	0	0	0	0	0	0	739	791	0	275	1,805	36,486
	0092	0	5,316	14,036	53	136	19,541	0	162	200	0	0	362	0	519	1,059	0	0	1,578	21,481
	0115	0	0	921	0	0	921	0	0	640	0	0	640	0	0	2,417	124	0	2,541	4,102
	0148	0	5,034	2,185	0	0	7,219	0	900	1,247	0	0	2,147	0	2,353	5,173	0	0	7,526	16,892
F	0002	0	0	650	0	0	650	0	0	0	0	0	0	0	0	0	0	0	0	650
	0004	0	13,994	459	0	465	14,918	0	5,011	887	0	167	6,065	0	19,862	1,923	0	464	22,249	43,232
	0006	0	612	0	0	13	625	0	0	0	0	0	0	0	0	0	0	0	0	625
	0014	0	220	218	0	0	438	0	0	0	0	0	0	0	0	0	0	0	0	438

TABLE E-2
ALLOTMENTS, LAND STATUS, ACREAGE, AND RANGE CONDITION
BY MANAGEMENT CATEGORY

LAND STATUS ACRES

MGT	ALLOT			FEDERAL			SUB			STATE			SUB			PRIVATE			SUB	ALLOT
CAT	NO.	EXCEL	GOOD	FAIR	POOR	NON RG	TOTAL	EXCEL	GOOD	FAIR	POOR	NON RG	TOTAL	EXCEL	GOOD	FAIR	POOR	NON RG	TOTAL	TOTAL
F	0015	0	55	305	0	0	360	0	0	0	0	0	0	0	579	173	0	0	752	1,112
	0019	0	1,097	0	0	44	1,141	0	960	61	0	58	1,079	0	92	0	0	0	92	2,312
	0020	0	0	559	0	0	559	0	0	0	0	0	0	0	0	720	0	0	720	1,279
	0027	0	560	0	0	0	560	0	0	0	0	0	0	0	1,174	107	0	0	1,281	1,841
	0033	0	0	481	0	0	481	0	0	0	0	0	0	0	0	161	0	0	161	642
	0036	0	183	0	0	0	183	0	740	0	0	0	740	0	0	0	0	0	0	923
	0039	0	12	48	0	0	60	0	0	0	0	0	0	0	117	44	0	0	161	221
	0041	0	1,892	80	0	0	1,972	0	0	0	0	0	0	0	1,170	0	0	0	1,170	3,142
	0042	0	198	0	0	0	198	0	0	0	0	0	0	0	172	0	0	0	172	370
	0045	0	320	0	0	0	320	0	1,680	0	0	0	1,680	0	0	0	0	0	0	2,000
	0049	0	19	364	0	0	383	0	0	8	0	0	8	0	0	419	0	0	419	810
	0061	0	0	312	0	8	320	0	0	640	0	0	640	0	0	481	0	0	481	1,441
	0062	0	4,776	922	0	0	5,698	0	0	0	0	0	0	0	2,351	690	0	0	3,041	8,739
	0067	0	1,668	703	0	0	2,371	0	0	0	0	0	0	0	542	180	0	34	756	3,127
	0074	0	0	429	0	0	429	0	0	0	0	0	0	0	0	2,585	0	0	2,585	3,014
	0075	0	520	0	0	0	520	0	580	0	0	0	580	0	0	0	0	0	0	1,100
	0077	0	921	32	0	0	953	0	0	0	0	0	0	0	0	0	0	0	0	953
	0080	0	0	319	0	0	319	0	0	0	0	0	0	0	0	1,280	0	0	1,280	1,599
	0085	0	849	0	0	0	849	0	0	0	0	0	0	0	3,521	378	0	0	3,899	4,748
	0086	0	0	641	0	0	641	0	0	0	0	0	0	0	0	0	0	0	0	641
	0091	0	160	0	0	0	160	0	0	0	0	0	0	0	0	0	0	0	0	160
	0095	0	0	300	0	0	300	0	0	0	0	0	0	0	0	0	0	0	0	300
	0097	0	0	613	0	0	613	0	0	0	0	0	0	0	0	1,671	0	0	1,671	2,284
	0100	0	3,685	307	0	0	3,992	0	1,245	35	0	0	1,280	0	656	105	0	0	761	6,033
	0103	0	1,307	230	0	0	1,537	0	1,664	219	0	0	1,883	0	4,502	118	35	0	4,655	8,075
	0104	0	0	240	0	0	240	0	0	0	0	0	0	0	0	0	0	0	0	240
	0105	0	0	160	0	0	160	0	0	0	0	0	0	0	0	0	0	0	0	160
	0113	0	0	20	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0	20
	0114	0	0	20	0	0	20	0	0	0	0	0	0	0	0	0	0	0	0	20

TABLE E-2
ALLOTMENTS, LAND STATUS, ACREAGE, AND RANGE CONDITION
BY MANAGEMENT CATEGORY

LAND STATUS ACRES

MGT CAT	ALLOT NO.	FEDERAL EXCEL	FEDERAL GOOD	FEDERAL FAIR	FEDERAL POOR	FEDERAL NON RG	FEDERAL SUB TOTAL	STATE EXCEL	STATE GOOD	STATE FAIR	STATE POOR	STATE NON RG	STATE SUB TOTAL	PRIVATE EXCEL	PRIVATE GOOD	PRIVATE FAIR	PRIVATE POOR	PRIVATE NON RG	PRIVATE SUB TOTAL	ALLOT TOTAL
F	0117	0	633	112	0	0	745	0	0	0	0	0	0	0	627	26	0	0	653	1,398
	0118	0	0	40	0	0	40	0	0	0	0	0	0	0	0	672	0	0	672	712
	0120	0	1,311	135	0	0	1,446	0	0	0	0	0	0	0	490	282	0	0	772	2,218
	0123	0	2,804	21	0	0	2,825	0	281	0	0	0	281	0	2,263	480	0	0	2,743	5,849
	0124	0	40	0	0	0	40	0	0	0	0	0	0	0	0	0	0	0	0	40
	0125	0	392	88	0	0	480	0	606	34	0	0	640	0	0	0	0	0	0	1,120
	0127	0	961	0	0	0	961	0	0	0	0	0	0	0	0	0	0	0	0	961
	0128	0	0	200	0	0	200	0	0	0	0	0	0	0	0	0	0	0	0	200
	0130	0	0	176	0	0	176	0	0	0	0	0	0	0	0	0	0	0	0	176
	0132	0	156	31	0	0	187	0	0	0	0	0	0	0	0	0	0	0	0	187
	0137	0	215	0	0	0	215	0	0	0	0	0	0	0	0	0	0	0	0	215
	0138	0	880	0	0	0	880	0	0	0	0	0	0	0	0	0	0	0	0	880
	0139	0	103	0	0	0	103	0	0	0	0	0	0	0	0	0	0	0	0	103
	0140	0	640	0	0	0	640	0	0	0	0	0	0	0	0	0	0	0	0	640
	0141	0	150	486	0	0	636	0	0	0	0	0	0	0	0	0	0	0	0	636
	0142	0	40	80	0	0	120	0	0	0	0	0	0	0	0	0	0	0	0	120
	0143	0	17	159	0	0	176	0	0	0	0	0	0	0	878	1,316	0	0	2,194	2,370
	0144	0	200	0	0	0	200	0	0	0	0	0	0	0	0	0	0	0	0	200
	0146	0	480	0	0	0	480	0	0	0	0	0	0	0	0	0	0	0	0	480
	0147	0	0	539	0	0	539	0	0	0	0	0	0	0	0	0	0	0	0	539
	0153	0	3,454	1,191	0	0	4,645	0	2,545	1,062	0	0	3,607	0	13	0	0	0	13	8,265
	0155	0	1,736	1,021	0	5,822	8,579	0	1,052	151	0	1,315	2,518	0	3,991	581	0	7,329	11,901	22,998
	0157	0	279	25	0	0	304	0	0	0	0	0	0	0	266	55	0	0	321	625
	0158	0	1,286	239	0	2,119	3,644	0	421	151	0	68	640	0	5,114	1,826	0	1,720	8,660	12,944
	0162	0	524	651	0	1,994	3,169	0	0	0	0	0	0	0	356	143	0	109	608	3,777
	0164	0	80	0	0	0	80	0	0	0	0	0	0	0	0	0	0	0	0	80
	0166	0	304	176	0	0	480	0	640	0	0	0	640	0	2,917	151	0	0	3,068	4,188
	0167	0	514	83	0	0	597	0	0	0	0	0	0	0	360	312	0	0	672	1,269
	0168	0	0	320	0	0	320	0	0	1,414	0	0	1,414	0	0	2,173	0	0	2,173	3,907

TABLE E-2

ALLOTMENTS, LAND STATUS, ACREAGE, AND RANGE CONDITION
BY MANAGEMENT CATEGORY

LAND STATUS ACRES

MGT	ALLOT	FEDERAL					SUB	STATE					SUB	PRIVATE					SUB	ALLOT
CAT	NO.	EXCEL	GOOD	FAIR	POOR	NON RG	TOTAL	EXCEL	GOOD	FAIR	POOR	NON RG	TOTAL	EXCEL	GOOD	FAIR	POOR	NON RG	TOTAL	TOTAL
F	0170	0	1,265	0	0	0	1,265	0	0	0	0	0	0	0	0	0	0	0	0	1,265
	0173	0	0	320	0	0	320	0	0	0	0	0	0	0	0	0	0	0	0	320
	0175	0	920	0	0	0	920	0	0	0	0	0	0	0	0	0	0	0	0	920
	0177	0	320	0	0	0	320	0	0	0	0	0	0	0	0	0	0	0	0	320
	0178	0	320	0	0	0	320	0	0	0	0	0	0	0	0	0	0	0	0	320
	0179	0	107	26	0	0	133	0	0	0	0	0	0	0	0	0	0	0	0	133
	0182	0	323	157	0	0	480	0	0	0	0	0	0	0	0	0	0	0	0	480
	0184	0	0	152	0	0	152	0	0	0	0	0	0	0	0	0	0	0	0	152
	0185	0	480	0	0	0	480	0	0	0	0	0	0	0	0	0	0	0	0	480
	0186	0	167	0	0	0	167	0	0	0	0	0	0	0	0	0	0	0	0	167
	0187	0	1,423	359	0	0	1,782	0	0	0	0	0	0	0	0	0	0	0	0	1,782
	0189	0	3,233	180	0	0	3,413	0	0	0	0	0	0	0	0	0	0	0	0	3,413
	0192	0	0	205	0	0	205	0	0	0	0	0	0	0	0	489	0	0	489	694
	0193	0	805	0	0	157	962	0	0	0	0	0	0	0	0	0	0	0	0	962

SEE TABLE E-3 FOR SUMMATION

SOURCE: BLM SOCORRO DISTRICT PLANNING/EIS FILES

TABLE E-3

SUMMARY OF ALLOTMENTS, LAND STATUS, ACREAGE AND RANGE CONDITION BY MANAGEMENT CATEGORY*

Mgmt. Category	Land Status	Excel.	Good	Fair	Poor	Non Rg.	Total
B	Public	386	63,721	268,159	7,393	19,178	358,837
	State	81	15,050	75,698	4,443	1,205	96,477
	Private	29	23,685	136,505	5,500	4,680	170,399
	Total	496	102,456	480,362	17,336	25,063	625,713
D	Public	1,506	220,870	48,015	271	35,491	306,153
	State	952	34,598	11,690	0	5,557	52,797
	Private	1,806	92,172	51,708	485	20,997	167,168
	Total	4,264	347,640	111,413	756	62,045	526,118
E	Public	0	97,235	115,101	1,284	7,995	221,615
	State	0	15,583	17,477	199	6	33,265
	Private	0	27,929	27,453	355	284	56,021
	Total	0	140,747	160,031	1,838	8,285	310,901
F	Public	0	59,610	15,584	0	10,622	85,816
	State	0	17,425	4,662	0	1,608	23,695
	Private	0	52,013	19,541	35	9,656	81,245
	Total	0	129,048	39,787	35	21,886	190,756
Total Mgmt. Category							
	Public	1,892	441,436	446,859	8,948	73,286	972,421
	State	1,033	82,656	109,527	4,642	8,376	206,234
	Private	1,835	195,799	235,207	6,375	35,617	474,833
Grand Total		4,760	719,891	791,593	19,965	117,279	1,653,488**

* 13,671 acres of unallotted public land have not been classified into a management category.

** These figures reflect only land status directly related to BLM grazing allotments.

Source: BLM Socorro District Planning/EIS Files.

APPENDIX F

Cultural Resources

LABORATORY OF ANTHROPOLOGY (LA)
ARCHAEOLOGICAL RECORDS MANAGEMENT SYSTEM (ARMS)
BLM QUEMADO STUDY AREA DATA

Certain pertinent data from the LA computer is included in this EIS in order that the possibilities for observations regarding site trends might be realized. This information is in reference to site condition, site size, topography, elevation, ecological zone, Anasazi Sites by period, features by culture, and observations.

Site Condition

One of the more important considerations for proper cultural resource management is site condition - the factors responsible for site deterioration. As can be seen from the Table F-1, "combined effects" on sites affected some 51 sites. Out of these 51 sites, 27 have been vandalized. If the 2 sites disturbed by mechanical devices are added, then the total number of sites vandalized reaches 29 (of the total 332 sites discovered during the survey).

TABLE F-1

SITE CONDITION BLM QUEMADO STUDY AREA

	Site Condition	
	Frequency	Percent
Intact	1	0.30
Eroded	273	82.23
Mechanical Disturbance	2	0.60
Combined Effects	51	15.36
Other	5	1.51

Source: Archaeological Records Management System

It is important to note that this small percentage of vandalism does not reflect the total problem of vandalism in the past or its effects on large Tularosa Phase pueblos prevalent in the Quemado region but not necessarily present on BLM administered public land.

Of the combined effects category, only six sites were directly impacted by cattle; i.e., "cattle trampling" or "cow trails", etc.

Another six sites were indirectly, but adversely, affected by chaining. These six sites were within the same sample unit of one section.

Site Size

Table F-2 shows approximate site size and Table F-3 shows culture by size:

TABLE F-3

ARCHEOLOGICAL RECORDS MANAGEMENT SYSTEM
BLM QUEMADO STUDY AREA
CULTURAL RESOURCES (ALL COMPONENTS)

TABLE OF CULTURE BY SIZE

CULTURE SIZE APPROX. SITE SIZE

FREQUENCY PERCENT ROW PCT COL PCT	1-25 SQ M	25-100 SQ M	100-500 SQ M	500-1000 SQ M	1000-5000 SQ M	5000-10000 SQ M	GREATER THAN 10,	UNKNOWN	TOTAL
PALEO-INDIAN	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	1 0.21 100.00 1.27	0 0.00 0.00 0.00	1 0.21
ARCHAIC	0 0.00 0.00 0.00	1 0.21 1.04 5.26	11 2.33 11.46 19.64	10 2.12 10.42 17.24	40 8.47 41.67 21.86	10 2.12 10.42 19.61	24 5.08 25.00 30.38	0 0.00 0.00 0.00	96 20.34
ANASAZI	3 0.64 1.59 18.75	7 1.48 3.70 36.84	15 3.18 7.94 26.79	24 5.08 12.70 41.38	75 15.89 39.68 40.98	28 5.93 14.81 54.90	36 7.63 19.05 45.57	1 0.21 0.53 10.00	189 40.04
NAVAJO	0 0.00 0.00 0.00	0 0.00 0.00 0.00	1 0.21 100.00 1.79	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	1 0.21
UNKNOWN	13 2.75 7.03 81.25	11 2.33 5.95 57.89	29 6.14 15.68 51.79	24 5.08 12.97 41.38	68 14.41 36.76 37.16	13 2.75 7.03 25.49	18 3.81 9.73 22.78	9 1.91 4.86 90.00	185 39.19
TOTAL	16 3.39	19 4.03	56 11.86	58 12.29	183 38.77	51 10.81	79 16.74	10 2.12	472 100.00

Source: Archaeological Records Management System

TABLE F-2

APPROXIMATE SITE SIZE
BLM QUEMADO STUDY AREA

Size	Frequency	Cum. Freq.	Percent	Cum. Percent
1-25 SQ M	16	16	4.82	4.82
25-100 SQ M	17	33	5.12	9.94
100-500 SQ M	47	80	14.16	24.10
500-1,000 SQ M	48	128	14.46	38.55
1,000-5,000 SQ M	128	256	38.55	77.11
5,000-10,000 SQ M	29	285	8.74	85.84
GREATER THAN 10,000	40	325	12.05	97.89
UNKNOWN	7	332	2.11	100.00

Source: Archaeological Records Management System

Topography

Though the site survey was stratified on the basis of gross soils associations, the survey units spanned the total spectrum of topographic variation possible in this southeastern margin of the Colorado Plateau region as can be seen from Table F-4.

TABLE F-4
LOCAL TOPOGRAPHY
BLM QUEMADO STUDY AREA

Topography	Frequency	Cum. Freq.	Percent	Cum. Percent
Arroyo/Wash	14	14	4.22	4.22
Base of Cliff	1	15	0.30	4.52
Bench	26	41	7.83	12.35
Blow Out	1	42	0.30	12.65
Canyon Rim	4	46	1.21	13.86
Cliff/Scarp	7	53	2.11	15.96
Dune	1	54	0.30	16.27
Hill Top	17	71	5.12	21.39
Hill Slope	85	156	25.60	46.99
Low Rise	22	178	6.63	53.61
Mesa	22	200	6.63	60.24
Mountain	3	203	0.90	61.15
Foothill	2	205	0.60	61.75
Plain	12	217	3.61	65.36
Ridge	84	301	25.30	90.66
Saddle	1	302	0.30	90.96
Talus Slope	2	304	0.60	91.57
Terrace	15	319	4.52	96.08
Alluvial Fan	6	325	1.81	97.89
Other	7	332	2.11	100.00

Source: Archaeological Records Management System

Table F-5 shows a more specific breakdown of culture by topography.

Tables F-6 and F-7 show where one can expect sites in regard to site elevations.

TABLE F-6

MEANS OF SITE ELEVATIONS
(by Culture)
BLM QUEMADO STUDY AREA

Culture	Mean Elevation of Site
Paleo/Indian	6,600 ft.
Archiac	7,000 ft.
Anasazi	6,800 ft.
Navajo	7,200 ft.
Unknown	7,000 ft.

Source: Archaeological Records Management System.

TABLE F-7

SITE FREQUENCY BY ELEVATION MID-POINT
BLM QUEMADO STUDY AREA

Elevation Mid-Point	Frequency
6,250	4+
6,500	56+
6,750	108+
7,000	50+
7,250	74+
7,500	28+
7,750	4+
8,000	0
8,250	0

Source: Archaeological Records Management System.

Ecological Zone

There are only three ecological zones, shown in Table F-8, that are pertinent to this EIS.

TABLE F-5

ARCHEOLOGICAL RECORDS MANAGEMENT SYSTEM
BLM QUEMADO STUDY AREA
CULTURAL RESOURCES (ALL COMPONENTS)

TABLE OF CULTURE BY TOPO

CULTURE TOPO LOCAL TOPOGRAPHY

FREQUENCY PERCENT ROW PCT COL PCT	ARROYO/WASH	BASE OF CLIFF	BENCH	BLOW OUT	CANYON RIM	CLIFF/SCARP	DUNE	HILL TOP	HILL SLOPE	LOW RISE	TOTAL
PALEO-INDIAN	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	1 0.21 100.00 0.85	0 0.00 0.00 0.00	1 0.21
ARCHAIC	3 0.64 3.13 15.00	0 0.00 0.00 0.00	13 2.75 13.54 33.33	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	1 0.21 1.04 33.33	8 1.69 8.33 29.63	23 4.87 23.96 19.66	7 1.48 7.29 21.21	96 20.34
ANASAZI	9 1.91 4.76 45.00	1 0.21 0.53 100.00	11 2.33 5.82 28.21	1 0.21 0.53 100.00	2 0.42 1.06 50.00	4 0.85 2.12 50.00	1 0.21 0.53 33.33	11 2.33 5.82 40.74	46 9.75 24.34 39.32	16 3.39 8.47 48.48	189 40.04
NAVAJO	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	1 0.21
UNKNOWN	8 1.69 4.32 40.00	0 0.00 0.00 0.00	15 3.18 8.11 38.46	0 0.00 0.00 0.00	2 0.42 1.08 50.00	4 0.85 2.16 50.00	1 0.21 0.54 33.33	8 1.69 4.32 29.63	47 9.96 25.41 40.17	10 2.12 5.41 30.30	185 39.19
TOTAL	20 4.24	1 0.21	39 8.26	1 0.21	4 0.85	8 1.69	3 0.64	27 5.72	117 24.79	33 6.99	472 100.00

(CONTINUED)

TABLE F-5

ARCHEOLOGICAL RECORDS MANAGEMENT SYSTEM
BLM QUEMADO STUDY AREA
CULTURAL RESOURCES (ALL COMPONENTS)

TABLE OF CULTURE BY TOPO

CULTURE / TOPO (LOCAL TOPOGRAPHY) FREQUENCY PERCENT ROW PCT COL PCT	MESA	MOUNTAIN	FOOTHILL	PLAIN	RIDGE	SADDLE	TALUS SLOPE	TERRACE	ALLUVIAL FAN	OTHER	TOTAL
PALEO-INDIAN	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	1 0.21
ARCHAIC	6 1.27 6.25 21.43	0 0.00 0.00 0.00	1 0.21 1.04 33.33	0 0.00 0.00 0.00	28 5.93 29.17 22.22	0 0.00 0.00 0.00	0 0.00 0.00 0.00	3 0.64 3.13 15.79	2 0.42 2.08 25.00	1 0.21 1.04 9.09	96 20.34
ANASAZI	10 2.12 5.29 35.71	4 0.85 2.12 66.67	2 0.42 1.06 66.67	8 1.69 4.23 53.33	46 9.75 24.34 36.51	0 0.00 0.00 0.00	1 0.21 0.53 50.00	10 2.12 5.29 52.63	3 0.64 1.59 37.50	3 0.64 1.59 27.27	189 40.04
NAVAJO	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	1 0.21 100.00 6.67	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	1 0.21
UNKNOWN	12 2.54 6.49 42.86	2 0.42 1.08 33.33	0 0.00 0.00 0.00	6 1.27 3.24 40.00	52 11.02 28.11 41.27	1 0.21 0.54 100.00	1 0.21 0.54 50.00	6 1.27 3.24 31.58	3 0.64 1.62 37.50	7 1.48 3.78 63.64	185 39.19
TOTAL	28 5.93	6 1.27	3 0.64	15 3.18	126 26.69	1 0.21	2 0.42	19 4.03	8 1.69	11 2.33	472 100.00

Source: Archaeological Records Management System

TABLE F-8

ECOLOGICAL ZONE
BLM QUEMADO STUDY AREA

Ecozone	Frequency	Cum. Freq.	Percent	Cum. Percent
Forest	33	33	9.94	9.94
Woodland	281	314	84.64	94.58
Grassland	18	332	5.42	100.00

Source: Archaeological Records Management System

Such rigid categories tend to distort an observation noted by the principal investigator for the University of Tulsa and the BLM Area Archaeologist as work progressed toward the end of the field season. That observation was that sites tended to cluster at the edge of the pinyon-juniper woodland as it fades into the grassland ecotone. A further breakdown reveals that most "Anasazi" sites (152 out of 189) occur in the "woodland" environment (Table F-9). Anasazi sites by period can be seen in Table F-10.

Certain features that one may expect to encounter in future surveys in the Quemado region are listed in Table F-11.

Observations

One obvious shortcoming of the cultural division into only the five classes of Table F-12 is the failure of the Mogollon division to appear. Since the survey area lies almost entirely within what is termed the Mogollon-Anasazi Interaction Sphere, this makes for a crucial data gap. To overcome this would require a refinement of the basic program to include pottery types into Mogollon brownware frequencies versus Anasazi whiteware frequencies. However, even if this were done, such traditional attempts at percentages of brownware versus whiteware are really inconculsive.

TABLE F-12

COMPONENTS BY CULTURE
BLM QUEMADO STUDY AREA

	Frequency	Cum. Freq.	Percent	Cum. Per.
Paleo-Indian	1	1	0.21	0.21
Archaic	96	97	20.34	20.55
Anasazi	189	286	40.04	60.59
Navajo	1	287	0.21	60.81
Unknown	185	472	39.20	100.00

Source: Archaeological Records Management System.

TABLE F-9

CULTURE BY ECOZONE
(all components)
BLM QUEMADO STUDY AREA

	Ecozone	Ecological Zone		
Culture	Forest	Woodland	Grassland	Total
Paleo-Indian				
Frequency	0.00	1.00	0.00	1.00
Percent	0.00	0.21	0.00	0.21
Row. Pct.	0.00	100.00	0.00	
Col. Pct.	0.00	0.25	0.00	
Archaic				
Frequency	6.00	86.00	4.00	96.00
Percent	1.27	18.22	0.85	20.34
Row. Pct.	6.25	89.58	4.17	
Col. Pct.	10.53	21.77	20.00	
Anasazi				
Frequency	33.00	152.00	4.00	189.00
Percent	6.99	32.20	0.85	40.04
Row. Pct.	17.46	80.42	2.12	
Col. Pct.	57.89	38.48	20.00	
Navajo				
Frequency	0.00	1.00	0.00	1.00
Percent	0.00	0.21	0.00	0.21
Row. Pct.	0.00	100.00	0.00	
Col. Pct.	0.00	0.25	0.00	
Unknown				
Frequency	18.00	155.00	12.00	185.00
Percent	3.81	32.84	2.54	39.19
Row. Pct.	9.73	83.78	6.49	
Col. Pct.	31.58	39.24	60.00	
TOTAL	57.00	395.00	20.00	472.00

Source: Archaeological Records Management System.

TABLE F-10

PERIOD BY CULTURE
BLM QUEMADO STUDY AREA

	Culture
Period	Anasazi
BM II:AD 1-500	
Frequency	1.00
Row.	0.21
Col.	100.00
Percent	0.53
BM II-III:AD 1-7	
Frequency	1.00
Row.	0.21
Col.	100.00
Percent	0.53
BM III:AD 500-70	
Frequency	14.00
Row.	2.97
Col.	100.00
Percent	7.41
BM III-PI:AD 500	
Frequency	2.00
Row.	0.42
Col.	100.00
Percent	1.06
P I:AD 700-900	
Frequency	5.00
Row.	1.06
Col.	100.00
Percent	2.65
P I-II:AD 700-11	
Frequency	18.00
Row.	3.81
Col.	100.00
Percent	9.52

TABLE F-10 (continued)

PERIOD BY CULTURE
BLM QUEMADO STUDY AREA

Period	Culture Anasazi
P I-III:AD 700-1	
Frequency	7.00
Row.	1.48
Col.	100.00
Percent	3.70
P II:AD 900-1100	
Frequency	103.00
Row.	21.82
Col.	100.00
Percent	54.50
P II-III:AD 900-	
Frequency	19.00
Row.	4.03
Col.	100.00
Percent	10.05
P III:AD 1100-13	
Frequency	7.00
Row.	1.48
Col.	100.00
Percent	3.70
TOTAL	189.00

Source: Archaeological Records Management System.

TABLE F-11
FEATURE BY CULTURE
BLM QUEMADO STUDY AREA

Feature	Culture					
Frequency	Paleo-Indian	Archaic	Anasazi	Navajo	Unknown	Total
Cairn	0	0	0	0	2	2
Ceramic	0	0	130	0	17	147
Ceramic Scatter	0	0	9	0	0	9
Corral	0	0	0	0	6	6
Depression	0	1	18	0	10	29
Dugout	0	0	0	0	1	1
Hearth	0	15	37	1	46	99
Historic Trash	0	0	0	0	1	15
House Extant	0	0	0	0	2	2
House Foundation	0	0	0	0	2	2
Isolated Room (Adobe)	0	0	1	0	0	1
Isolated Room (Jacal)	0	0	5	0	0	5
Lithic Quarry	0	0	0	0	6	6
Lithic Scatter	0	59	14	0	131	204
Lithic/Ceramic Scatter	0	0	95	0	7	102
Log Cabin	0	0	0	0	1	1
Midden	0	0	37	0	4	41
Mound	0	0	4	0	0	4
Petroglyph	0	0	1	0	21	22
Possible Jacal Structure	0	0	5	0	0	5
Possible Masonry Structure	0	0	20	0	3	23
Rockshelter	0	1	5	0	6	12
Roomblock (Masonry)	0	0	37	0	0	37
Stone Circles	0	0	0	0	3	3
Undefined Rock Alignment	0	3	5	0	4	12
Water Control Device	0	0	1	0	0	1
Wall	0	0	3	0	2	5
Possible Hearth	0	10	24	0	25	59

Source: Archaeological Records Management System.

It should also be added that during the encoding of the Quemado data into the ARMS computer, the request was made to use "Archiac" only when diagnostic point types were identified on the original field forms. Even with this attempt to be cautious in classifying components as "Archiac" at sites, problems remain. There are no excavations in the Quemado region that have ever been undertaken to actually date point types commonly assumed to be Archaic. Many of the Archaic manifestations are present in a multi-component setting and may actually reflect surface evidence of buried Basketmaker sites. In other words, some of the later point types often called Archaic may in fact be Basketmaker in origin. From the lithic information gathered during the survey, we are still not able to determine what constitutes an Archaic assemblage (Gossett and Gossett 1982). Under the limited collections policy of the survey contract, no tool kits are available for analysis. None of these problems should detract from the obvious; that being the fact that future researchers now have some 96 possible Archaic components to work from in a region where none had been recorded before.

One last observation deals with potential future research regarding the historic settlements and settlement patterns in the Quemado region. Although 24 historic structures or historic features were identified in the Quemado survey, the interesting story of the homestead period has yet to be told, except by Vogt (1955) and Vogt and Albert (1967).

APPENDIX G

Recreation

METHODOLOGY FOR PROJECTING FUTURE DEER HUNTING VISITOR DAYS

Deer hunting visitor days are projected for the various alternatives by using the following method:

At present, 4,164 deer hunting visitor days are occurring on the public land within the DPA. These hunters are pursuing a deer population of 2,200. Dividing hunting visitor days by the deer populations results in 1.9 visitor days for each deer. Assuming this amount of hunting pressure continues, future visitor days are projected by multiplying 1.9 by the projected population.

	Deer Population	Projected Hunter Visitor Days
Preferred Alternative	4,500	8,500
No Action	2.200	4,180
Elimination of Livestock Grazing	4,500	8,550
Maximization of Livestock Forage Production	4,500	8,550

APPENDIX H

Economic Conditions

TABLE H-1

ESTIMATED COSTS AND RETURNS FOR SUBSISTANCE RANCH SIZE CATEGORY IN THE DIVIDE PLANNING AREA, 1981

Item	Unit	Number	Average Weight/Cwt	Price Cwt	Total Value
Sales:					
Steer Calves	Head	11	4.30	82.04	$3,880
Heifer Calves	Head	8	4.05	68.04	2,204
Yearling Heifers	Head	1	6.30	62.67	394
Cull Cows	Head	2	9.00	34.73	625
Total					$7,105*
Total/cow					263.14

	Total Value	Value/ Cow
Cash Costs:		
BLM Grazing Fee	$346	$ 12.81
Private Range Lease/Rent	245	9.07
State Lease	43	1.59
Protein Supplement	601	22.26
Salt and Mineral	44	1.63
Veterinary and Medicine	101	3.74
Hired Trucking	103	3.81
Marketing	100	3.70
Fuel and Lubricants	363	13.44
Repairs	251	9.30
Taxes	233	8.63
Insurance	169	6.26
Interest on Operating Capital	221	8.19
General Farm Overhead	305	11.30
Hired Labor	26	0.96
Total Cash Costs	$3,151	$116.69
Other Costs:		
Family Labor	$1,240	$ 45.93
Depreciation	1,132	41.93
Interest on Investment Other Than Land	3,075	113.89
**Interest on Land	7,763	287.52
Total Other Costs	$13,210	$489.27

TABLE H-1 (continued)

ESTIMATED COSTS AND RETURNS FOR SUBSISTANCE RANCH SIZE CATEGORY IN THE DIVIDE PLANNING AREA, 1981

	Total Value	Value/ Cow
Total All Costs	$16,361	$605.96
Return Above Cash Costs	$ 3,954	$146.44
Return Above Cash Costs and Family Labor	$ 2,714	$100.50
Return to Total Investment	$ 1,582	$ 58.60
Return to Land	$-1,493	$ 55.30

FOOTNOTE: Average herd 27 cows, 87 percent calf crop based on January 1 bred cow inventory with fall pregnancy test, 4 percent calf loss birth to weaning, 3 percent annual cow loss, 13 percent replacement rate, 16 cows per bull, cattle and purchased hay prices 1978-80 three year averages, all other prices 1980, percent forage dependency West Socorro EIS BLM 40 percent, deeded range 43 percent, state land 6 percent, range lease 9 percent, protein supplement 2 percent, real estate is valued on an AU basis.

* Total will not equal due to rounding.

** Interest on land is not calculated into Return to Land.

Source: BLM Socorro District Planning/EIS Files.

TABLE H-2

ESTIMATED COSTS AND RETURNS FOR SUBSISTANCE RANCH SIZE CATEGORY WITH INCREMENTAL INCREASES IN THE DIVIDE PLANNING AREA

Item	No Change	Percent Increases 10	20	30
	Dollars			
Gross Income	7,105	7,393	7,681	7,952
Total Cash Costs	3,151	3,231	3,312	3,388
Value of Family Labor	1,240	1,291	1,342	1,389
Depreciation	1,132	1,147	1,162	1,176
Interest on Investment Other Than Land	3,075	3,167	3,259	3,346
Return Above:				
Cash Costs	3,954	4,162	4,369	4,564
Cash Costs and Family Labor	2,714	2,871	3,027	3,175
Return to Total Investment	1,582	1,724	1,865	1,999
Return to Land	-1,493	-1,443	-1,394	-1,347
	Head			
Herd Size	27.00	28.09	29.18	30.22
	Hours/Year			
Family Labor	370	385	400	415
Hired Labor	8	8	9	9

Source: BLM Socorro District Planning/EIS Files.

TABLE H-3

ESTIMATED COSTS AND RETURNS FOR SUBSISTANCE RANCH SIZE CATEGORY WITH INCREMENTAL REDUCTIONS IN THE DIVIDE PLANNING AREA

Item	Percent Reductions					
	10	20	30	40	50	100
	Dollars					
Gross Income	6,818	6,530	6,259	5,971	5,684	4,261
Total Cash Costs	3,070	2,990	2,914	2,833	2,752	2,354
Value of Family Labor	1,190	1,140	1,093	1,042	992	744
Depreciation	1,117	1,102	1,088	1,073	1,058	985
Interest on Investment Other Than Land	2,983	2,891	2,804	2,712	2,620	2,163
Return Above:						
Cash Costs	3,748	3,540	3,345	3,138	2,932	1,907
Cash Costs and Family Labor	2,558	2,400	2,252	2,096	1,940	1,163
Return to Total Investment	1,441	1,298	1,164	1,023	882	178
Return to Land	-1,542	-1,593	-1,640	-1,689	-1,738	-1,985
	Head					
Herd Size	26	25	24	23	22	16
	Hours/Year					
Family Labor	355	340	325	310	295	221
Hired Labor	9	8	8	8	7	5

Source: BLM Socorro District Planning/EIS Files.

TABLE H-4

ESTIMATED COSTS AND RETURNS FOR SMALL COMMERCIAL RANCH SIZE CATEGORY IN THE DIVIDE PLANNING AREA, 1981

Item	Unit	Number	Average Weight/Cwt	Price Cwt	Total Value
Sales:					
Steer Calves	Head	36	4.30	82.04	$12,699
Heifer Calves	Head	21	4.05	68.04	5,786
Yearling Steers	Head	15	6.75	70.33	7,120
Yearling Heifers	Head	17	6.30	62.67	6,711
Cull Cows	Head	9	9.00	34.73	2,813
Total					$35,133*
Total/cow					$283.33

Item	Total Value	Value/ Cow
Cash Costs:		
BLM Grazing Fee	$1,206	$ 9.73
Forest Grazing Fee	848	6.84
Private Range Lease/Rent	1,795	14.48
State Lease	186	1.50
Protein Supplement	907	7.31
Salt and Mineral	200	1.61
Veterinary and Medicine	280	2.26
Hired Trucking	329	2.65
Marketing	191	1.54
Fuel and Lubricants	3,195	25.76
Repairs	1,694	13.66
Taxes	1,152	9.29
Insurance	808	6.52
Interest on Operating Capital	1,002	8.08
General Farm Overhead	915	7.38
Hired Labor	2,908	23.45
Total Cash Costs	$17,616	$142.06

Item	Total Value	Value/ Cow
Other Costs:		
Family Labor	$ 2,908	$ 23.45
Depreciation	5,662	45.66
Interest on Investment Other Than Land	14,313	115.43
**Interest on Land	37,268	300.55
Total Other Costs	$60,151	$485.09

TABLE H-4 (continued)

ESTIMATED COSTS AND RETURNS FOR SMALL COMMERCIAL RANCH SIZE CATEGORY, IN THE DIVIDE PLANNING AREA, 1981

	Total Value	Value/ Cow
Total All Costs	$77,769	$627.17
Return Above Cash Costs	$17,517	$141.25
Return Above Cash Costs and Family Labor	$14,609	$117.81
Return to Total Investment	$ 8,947	$ 72.15
Return to Land	$-5,366	$-43.27

FOOTNOTE: Average herd 124 cows, 87 percent calf crop based on January 1 bred cow inventory with pregnancy test, 5 percent calf loss birth to weaning, 3 percent annual cow loss, 17 percent replacement rate, 22 cows per bull, cattle and purchased hay prices 1978-80 three year averages, all other costs 1980, percent forage dependency West Socorro EIS BLM 26 percent, National Forest 20 percent, deeded range 32 percent, state land 4 percent, range lease 11 percent, protein supplement 7 percent, real estate is valued on an AU basis.

* Total will not equal due to rounding.

** Interest on land is not calculated into Return to Land.

Source: BLM Socorro District Planning/EIS Files.

TABLE H-5

ESTIMATED COSTS AND RETURNS FOR SMALL COMMERCIAL RANCH SIZE CATEGORY WITH INCREMENTAL INCREASES IN THE DIVIDE PLANNING AREA

Item	No Change	Percent Increases 10	20	30
	Dollars			
Gross Income	35,133	36,130	37,128	38,126
Total Cash Costs	17,616	18,009	18,402	18,795
Value of Family Labor	2,908	2,991	3,073	3,155
Depreciation	5,662	5,696	5,730	5,764
Interest on Investment Other Than Land	14,313	14,618	14,922	15,227
Return Above:				
Cash Costs	17,517	18,121	18,726	19,331
Cash Costs and Family Labor	14,609	15,130	15,653	16,176
Return to Total Investment	8,947	9,434	9,923	10,412
Return to Land	-5,366	-5,184	-4,999	-4,815
	Head			
Herd Size	124	128	132	136
	Hours/Year			
Family Labor	868	893	918	943
Hired Labor	868	893	918	943

Source: BLM Socorro District Planning/EIS Files.

TABLE H-6

ESTIMATED COSTS AND RETURNS FOR SMALL COMMERCIAL RANCH SIZE CATEGORY WITH INCREMENTAL REDUCTIONS IN THE DIVIDE PLANNING AREA

Item	Percent Reductions					
	10	20	30	40	50	100
	Dollars					
Gross Income	34,135	33,137	32,139	31,141	30,143	25,152
Total Cash Costs	17,223	16,830	16,436	16,043	15,650	13,685
Value of Family Labor	2,826	2,744	2,661	2,579	2,497	2,083
Depreciation	5,628	5,595	5,561	5,527	5,493	5,324
Interest on Investment Other Than Land	14,008	13,703	13,398	13,093	12,788	11,265
Return Above:						
Cash Costs	16,912	16,307	15,703	15,098	14,493	11,467
Cash Costs and Family Labor	14,086	13,563	13,042	12,519	11,996	9,384
Return to Total Investment	8,458	7,968	7,481	6,992	6,503	4,060
Return to Land	-5,550	-5,735	-5,917	-6,101	-6,285	-7,205
	Head					
Herd Size	120	116	113	109	106	88
	Hours/Year					
Family Labor	843	818	793	768	743	620
Hired Labor	843	818	793	768	743	620

Source: BLM Socorro District Planning/EIS Files.

TABLE H-7

ESTIMATED COSTS AND RETURNS FOR MEDIUM COMMERCIAL RANCH SIZE CATEGORY IN THE DIVIDE PLANNING AREA, 1981

Item	Unit	Number	Average Weight/Cwt	Price Cwt	Total Value
Sales:					
Steer Calves	Head	78	4.30	82.04	$27,516
Heifer Calves	Head	48	4.05	68.04	13,226
Yearling Steers	Head	43	6.75	70.33	20,413
Yearling Heifers	Head	46	6.30	62.67	18,161
Cull Cows	Head	18	9.00	34.73	5,626
Total					$84,945*
Total/cow					$287.95

	Total Value	Value/ Cow
Cash Costs:		
BLM Grazing Fee	$ 2,253	$ 7.64
Forest Grazing Fee	1,539	5.22
Private Range Lease/Rent	6,240	21.15
State Lease	546	1.85
Protein Supplement	2,132	7.23
Salt and Mineral	475	1.61
Veterinary and Medicine	457	1.55
Hired Trucking	705	2.39
Marketing	548	1.86
Fuel and Lubricants	4,183	14.18
Repairs	3,001	10.17
Taxes	2,457	8.33
Insurance	1,858	6.30
Interest on Operating Capital	2,003	6.79
General Farm Overhead	1,726	5.85
Hired Labor	5,376	18.22
Total Cash Costs	$35,499	$120.34
Other Costs:		
Family Labor	$ 5,376	$ 18.22
Depreciation	10,785	36.56
Interest on Investment Other Than Land	32,799	111.18
**Interest on Land	83,600	283.39
Total Other Costs	$132,560	$449.36

TABLE H-7 (continued)

ESTIMATED COSTS AND RETURNS FOR MEDIUM COMMERCIAL RANCH SIZE CATEGORY IN THE DIVIDE PLANNING AREA, 1981

	Total Value	Value/ Cow
Total All Costs	$168,059	$569.69
Return Above Cash Costs	$ 49,446	$167.61
Return Above Cash Costs and Family Labor	$ 44,070	$149.39
Return to Total Investment	$ 33,285	$112.83
Return to Land	$ 486	$ 1.65

FOOTNOTE: Average herd 295 cows, 87 percent calf crop based on January 1 bred cow inventory with fall pregnancy test, 5 percent calf loss birth to weaning, 3 percent annual cow loss, 18 percent replacement rate, 20 cows per bull, cattle and purchased hay prices 1978-80 three year averages, all other prices 1980, percent forage dependency West Socorro EIS BLM 22 percent, Forest Service 15 percent, deeded range 37 percent, state land 6 percent, range lease 19 percent, protein supplement 1 percent, real estate is valued on an AU basis.

* Total will not equal due to rounding.

** Interest on land is not calculated into Return to Land.

Source: BLM Socorro District Planning/EIS Files.

TABLE H-8

ESTIMATED COSTS AND RETURNS FOR MEDIUM COMMERCIAL RANCH SIZE CATEGORY WITH INCREMENTAL INCREASES IN THE DIVIDE PLANNING AREA

Item	No Change	Percent Increases		
		10	20	30
	Dollars			
Gross Income	84,945	86,846	88,728	90,629
Total Cash Costs	35,499	36,089	36,672	37,262
Value of Family Labor	5,376	5,497	5,616	5,737
Depreciation	10,785	10,854	10,922	10,991
Interest on Investment Other Than Land	32,799	33,315	33,826	34,342
Return Above:				
Cash Costs	49,446	50,757	52,056	53,367
Cash Costs and Family Labor	44,070	45,260	46,440	47,630
Return to Total Investment	33,285	34,406	35,518	36,639
Return to Land	486	1,091	1,692	22,970
	Head			
Herd Size	295	302	309	316
	Hours/Year			
Family Labor	1,605	1,641	1,677	1,713
Hired Labor	1,605	1,641	1,677	1,713

Source: BLM Socorro District Planning/EIS Files.

TABLE H-9

ESTIMATED COSTS AND RETURNS FOR MEDIUM COMMERCIAL RANCH SIZE CATEGORY WITH INCREMENTAL REDUCTIONS IN THE DIVIDE PLANNING AREA

Item	Percent Reductions					
	10	20	30	40	50	100
	Dollars					
Gross Income	82,949	81,163	79,262	77,361	75,479	65,991
Total Cash Costs	34,881	34,326	33,736	33,146	32,563	29,622
Value of Family Labor	5,249	5,136	5,016	4,895	4,776	4,176
Depreciation	10,713	10,649	10,580	10,512	10,444	10,104
Interest on Investment Other Than Land	32,257	31,773	31,257	30,741	30,230	27,655
Return Above:						
Cash Costs	48,068	46,837	45,526	44,215	42,916	36,369
Cash Costs and Family Labor	42,819	41,701	40,510	39,320	38,140	32,193
Return to Total Investment	32,106	31,052	29,930	28,808	27,696	22,089
Return to Land	-151	-721	-1,327	-1,933	-2,534	-5,566
	Head					
Herd Size	288.06	282.50	275.39	269.50	262.00	229.50
	Hours/Year					
Family Labor	1,567	1,533	1,497	1,460	1,425	1,245
Hired Labor	1,567	1,533	1,497	1,460	1,425	1,240

Source: BLM Socorro District Planning/EIS Files.

TABLE H-10

ESTIMATED COSTS AND RETURNS FOR LARGE COMMERCIAL RANCH SIZE CATEGORY IN THE DIVIDE PLANNING AREA, 1981

Item	Unit	Number	Average Weight/Cwt	Price Cwt	Total Value
Sales:					
Steer Calves	Head	479	4.30	82.04	$168,977
Heifer Calves	Head	279	4.05	68.04	76,881
Yearling Steers	Head	167	6.75	70.33	79,279
Yearling Heifers	Head	154	6.30	62.67	60,802
Cull Cows	Head	94	9.00	34.73	29,381
Total					$415,323*
Total/cow					$354.67

	Total Value	Value/ Cow
Cash Costs:		
BLM Grazing Fee	$ 5,540	$ 4.73
Forest Grazing Fee	5,131	4.38
Private Range Lease/Rent	30,621	26.15
State Lease	2,677	2.29
Protein Supplement	13,080	11.17
Salt and Mineral	1,885	1.61
Veterinary and Medicine	1,628	1.39
Hired Trucking	2,741	2.34
Marketing	1,967	1.68
Fuel and Lubricants	7,621	6.51
Repairs	12,218	10.43
Taxes	9,011	7.70
Insurance	7,060	6.03
Interest on Operating Capital	7,804	6.66
General Farm Overhead	7,331	6.26
Hired Labor	24,007	20.50
Total Cash Costs	$140,322	$119.83
Other Costs:		
Family Labor	$ 16,006	$ 13.67
Depreciation	38,649	33.01
Interest on Investment Other Than Land	128,213	109.49
**Interest on Land	308,877	263.77
Total Other Costs	$491,745	$419.94

TABLE H-10 (continued)

ESTIMATED COSTS AND RETURNS FOR LARGE COMMERCIAL RANCH SIZE CATEGORY IN THE DIVIDE PLANNING AREA, 1981

	Total Value	Value/ Cow
Total All Costs	$632,067	$539.77
Return Above Cash Costs	$275,001	$234.07
Return Above Cash Costs and Family Labor	$258,995	$220.40
Return to Total Investment	$220,346	$187.39
Return to Land	$ 92,133	$ 77.90

FOOTNOTE: Average herd 1,171 cows, 86 percent calf crop based on January 1 bred cow inventory with fall pregnancy test, 5 percent calf loss birth to weaning, 3 percent annual cow loss, 17 percent replacement rate, 22 cows per bull, cattle and purchased hay prices 1978-80 three year averages, all other prices 1980, percent forage dependency West Socorro EIS BLM 9 percent, Forest Service 13 percent, deeded range 46 percent, state land 8 percent, range lease 23 percent, protein supplement 1 percent, real estate is valued on an AU basis.

* Total will not equal due to rounding.

** Interest on land is not calculated into Return to Land.

Source: BLM Socorro District Planning/EIS Files.

TABLE H-11

ESTIMATED COSTS AND RETURNS FOR LARGE COMMERCIAL RANCH SIZE CATEGORY WITH INCREMENTAL INCREASES IN THE DIVIDE PLANNING AREA

Item	No Change	Percent Increases		
		10	20	30
	Dollars			
Gross Income	415,323	418,953	422,585	426,215
Total Cash Costs	140,322	142,307	143,383	144,458
Value of Family Labor	16,006	16,146	16,286	16,426
Depreciation	38,649	38,746	38,843	38,939
Interest on Investment Other Than Land	128,213	129,099	129,986	130,873
Return Above:				
Cash Costs	275,001	276,646	279,202	281,757
Cash Costs and Family Labor	258,995	260,500	262,916	265,331
Return to Total Investment	220,346	22,175	224,073	226,392
Return to Land	92,133	92,655	94,087	95,519
	Head			
Herd Size	1,171	1,181	1,191	1,201
	Hours/Year			
Family Labor	4,775	4,817	4,859	4,901
Hired Labor	7,161	7,224	7,287	7,350

Source: BLM Socorro District Planning/EIS Files.

TABLE H-12

ESTIMATED COSTS AND RETURNS FOR LARGE COMMERCIAL RANCH SIZE CATEGORY WITH INCREMENTAL REDUCTIONS IN THE DIVIDE PLANNING AREA

Item	Percent Reductions					
	10	20	30	40	50	100
			Dollars			
Gross Income	411,653	408,022	404,391	400,760	397,128	378,975
Total Cash Costs	138,730	137,666	136,601	135,536	134,472	129,149
Value of Family Labor	15,868	15,728	15,589	15,449	15,309	14,609
Depreciation	38,556	38,460	38,363	38,267	38,170	37,686
Interest on Investment Other Than Land	127,327	126,440	125,554	124,668	123,782	119,350
Return Above:						
Cash Costs	272,923	270,356	267,790	265,224	262,656	249,826
Cash Costs and Family Labor	257,055	254,628	252,201	249,775	247,347	235,217
Return to Total Investment	218,499	216,168	213,838	211,508	209,177	197,531
Return to Land	91,172	89,728	88,284	86,840	85,395	78,181
			Head			
Herd Size	1,161	1,151	1,141	1,131	1,121	1,070
			Hours/Year			
Family Labor	4,733	4,691	4,649	4,607	4,565	4,357
Hired Labor	7,098	7,036	6,973	6,910	6,847	6,534

Source: BLM Socorro District Planning/EIS Files.

TABLE H-13

ESTIMATED COSTS AND RETURNS FOR REPRESENTATIVE RANCH OPERATIONS FOR A 10-PERCENT INCREASE IN LIVESTOCK ADJUSTMENTS IN THE DIVIDE PLANNING AREA, 1981

Budget Items	Subsistance	Small Commercial	Medium Commercial	Large Commercial	Total
Number of Operators	81	39	25	11	156
Livestock Sales	$7,393	$36,130	$86,846	$418,953	$8,787,536
Cash Cost	3,231	18,009	36,089	142,307	3,431,664
Net Cash Income	4,162	18,121	50,757	276,646	5,355,872
Depreciation	1,147	5,696	10,854	38,746	1,012,607
Net Income	3,015	12,425	39,903	237,900	4,343,265
*Other Costs	4,458	17,609	38,812	145,245	3,615,844
Return Net Income to Land	-$1,443	-$ 5,184	$ 1,091	$ 92,655	$ 727,421

* Other costs include family labor and interest in investments other than land.

Source: BLM Socorro District Planning/EIS Files.

TABLE H-14

ESTIMATED COSTS AND RETURNS FOR REPRESENTATIVE RANCH OPERATIONS FOR A 20-PERCENT INCREASE IN LIVESTOCK ADJUSTMENTS IN THE DIVIDE PLANNING AREA, 1981

Budget Items	Subsistance	Small Commercial	Medium Commercial	Large Commercial	Total
Number of Operators	81	39	25	11	156
Livestock Sales	$7,681	$37,128	$88,728	$422,585	$8,936,788
Cash Cost	3,312	18,402	36,672	143,383	3,479,963
Net Cash Income	4,369	18,726	52,056	279,202	5,456,825
Depreciation	1,162	5,730	10,922	38,843	1,017,915
Net Income	3,207	12,996	41,134	240,359	4,438,910
*Other Costs	4,601	17,995	39,442	146,272	3,669,528
Return Net Income to Land	-$1,394	-$ 4,999	$ 1,692	$ 94,087	$ 769,382

* Other costs include family labor and interest in investments other than land.

Source: BLM Socorro District Planning/EIS Files

TABLE H-15

ESTIMATED COSTS AND RETURNS FOR REPRESENTATIVE RANCH OPERATIONS FOR A 30-PERCENT INCREASE IN LIVESTOCK ADJUSTMENTS IN THE DIVIDE PLANNING AREA, 1981

Budget Items	Subsistance	Small Commercial	Medium Commercial	Large Commercial	Total
Number of Operators	81	39	25	11	156
Livestock Sales	$7,952	$38,126	$90,629	$426,215	$9,085,116
Cash Cost	3,388	18,795	37,262	144,458	3,528,021
Net Cash Income	4,564	19,331	53,367	281,757	5,557,095
Depreciation	1,176	5,764	10,991	38,939	1,023,156
Net Income	3,388	13,567	42,376	242,818	4,533,939
*Other Costs	4,735	18,382	40,079	147,299	3,722,697
Return Net Income to Land	-$1,347	-$ 4,815	$ 2,297	$ 95,519	$ 811,242

* Other costs include family labor and interest in investments other than land.

Source: BLM Socorro District Planning/EIS Files

TABLE H-16

ESTIMATED COSTS AND RETURNS FOR REPRESENTATIVE RANCH OPERATIONS FOR A 10-PERCENT DECREASE IN LIVESTOCK ADJUSTMENTS IN THE DIVIDE PLANNING AREA, 1981

Budget Items	Subsistance	Small Commercial	Medium Commercial	Large Commercial	Total
Number of Operators	81	39	25	11	156
Livestock Sales	$6,818	$34,135	$82,949	$411,653	$8,485,431
Cash Cost	3,070	17,223	34,881	138,730	3,318,422
Net Cash Income	3,748	16,912	48,068	272,923	5,167,009
Depreciation	1,117	5,628	10,713	38,556	1,001,910
Net Income	2,631	11,284	37,355	234,367	4,165,099
*Other Costs	4,173	16,834	37,506	143,195	3,507,334
Return Net Income to Land	-$1,542	-$ 5,550	-$ 151	$ 91,172	$ 657,765

* Other costs include family labor and interest in investments other than land.

Source: BLM Socorro District Planning/EIS Files

TABLE H-17

ESTIMATED COSTS AND RETURNS FOR REPRESENTATIVE RANCH OPERATIONS FOR A 20-PERCENT DECREASE IN LIVESTOCK ADJUSTMENTS IN THE DIVIDE PLANNING AREA, 1981

Budget Items	Subsistance	Small Commercial	Medium Commercial	Large Commercial	Total
Number of Operators	81	39	25	11	156
Livestock Sales	$6,530	$33,137	$81,163	$408,022	$8,338,590
Cash Cost	2,990	16,830	34,326	137,666	3,271,036
Net Cash Income	3,540	16,307	46,837	270,356	5,067,554
Depreciation	1,102	5,595	10,649	38,460	996,752
Net Income	2,438	10,712	36,188	231,896	4,070,802
*Other Costs	4,031	16,447	36,909	142,168	3,454,517
Return Net Income to Land	-$1,593	-$ 5,735	-$ 721	$ 89,728	$ 616,285

* Other costs include family labor and interest in investments other than land.

Source: BLM Socorro District Planning/EIS Files

TABLE H-18

ESTIMATED COSTS AND RETURNS FOR REPRESENTATIVE RANCH OPERATIONS FOR A 30-PERCENT DECREASE IN LIVESTOCK ADJUSTMENTS IN THE DIVIDE PLANNING AREA, 1981

Budget Items	Subsistance	Small Commercial	Medium Commercial	Large Commercial	Total
Number of Operators	81	39	25	11	156
Livestock Sales	$6,259	$32,139	$79,262	$404,391	$8,190,251
Cash Cost	2,914	16,436	33,736	136,601	3,223,049
Net Cash Income	3,345	15,703	45,526	267,790	4,967,202
Depreciation	1,088	5,561	10,580	38,363	991,500
Net Income	2,257	10,142	34,946	229,427	3,975,702
*Other Costs	3,897	16,059	36,273	141,143	3,401,356
Return Net Income to Land	-$1,640	-$ 5,917	-$ 1,327	$ 88,284	$ 574,346

* Other costs include family labor and interest in investments other than land.

Source: BLM Socorro District Planning/EIS Files

TABLE H-19

ESTIMATED COSTS AND RETURNS FOR REPRESENTATIVE RANCH OPERATIONS FOR A 40-PERCENT DECREASE IN LIVESTOCK ADJUSTMENTS IN THE DIVIDE PLANNING AREA, 1981

Budget Items	Subsistance	Small Commercial	Medium Commercial	Large Commercial	Total
Number of Operators	81	39	25	11	156
Livestock Sales	$5,971	$31,141	$77,361	$400,760	$8,040,535
Cash Cost	2,833	16,043	33,146	135,536	3,174,696
Net Cash Income	3,138	15,098	44,215	265,224	4,865,839
Depreciation	1,073	5,527	10,512	38,267	986,203
Net Income	2,065	9,571	33,703	226,957	3,879,636
*Other Costs	3,754	15,672	35,636	140,117	3,347,469
Return Net Income to Land	-$1,689	-$ 6,101	-$ 1,933	$ 86,840	$ 532,167

* Other costs include family labor and interest in investments other than land.

Source: BLM Socorro District Planning/EIS Files

TABLE H-20

ESTIMATED COSTS AND RETURNS FOR REPRESENTATIVE RANCH OPERATIONS FOR A 50-PERCENT DECREASE IN LIVESTOCK ADJUSTMENTS IN THE DIVIDE PLANNING AREA, 1981

Budget Items	Subsistance	Small Commercial	Medium Commercial	Large Commercial	Total
Number of Operators	81	39	25	11	156
Livestock Sales	$5,684	$30,143	$75,479	$397,128	$7,891,364
Cash Cost	2,752	15,650	32,563	134,472	3,126,529
Net Cash Income	2,932	14,493	42,916	262,656	4,764,835
Depreciation	1,058	5,493	10,444	38,170	980,895
Net Income	1,874	9,000	32,472	224,486	3,783,940
*Other Costs	3,612	15,285	35,006	139,091	3,293,838
Return Net Income to Land	-$1,738	-$ 6,285	-$ 2,534	$ 85,395	$ 490,102

* Other costs include family labor and interest in investments other than land.

Source: BLM Socorro District Planning/EIS Files

TABLE H-21

ESTIMATED COSTS AND RETURNS FOR REPRESENTATIVE RANCH OPERATIONS FOR A 100-PERCENT DECREASE IN LIVESTOCK ADJUSTMENTS IN THE DIVIDE PLANNING AREA, 1981

Budget Items	Subsistance	Small Commercial	Medium Commercial	Large Commercial	Total
Number of Operators	81	39	25	11	156
Livestock Sales	$4,261	$25,152	$65,991	$378,975	$7,144,569
Cash Cost	2,354	13,685	29,622	129,149	2,885,578
Net Cash Income	1,907	11,467	36,369	249,826	4,258,991
Depreciation	985	5,324	10,104	37,686	954,567
Net Income	922	6,143	26,265	212,140	3,304,424
*Other Costs	2,907	13,348	31,831	133,959	3,025,363
Return Net Income to Land	-$1,985	-$ 7,205	-$ 5,566	$ 78,181	$ 279,061

* Other costs include family labor and interest in investments other than land.

Source: BLM Socorro District Planning/EIS Files

GLOSSARY

ACRE-FOOT. The volume of liquid or solid required to cover 1 acre to a depth of 1 foot.

AGGREGATE. Structural units of soil. Aggregates are formed by the grouping of primary soil particles into a secondary unit.

ALLOTMENT MANAGEMENT PLAN (AMP). A documented program which applies to livestock operations on public land, prepared in consultation with the permittee(s) or lessee(s) involved, and which: (1) prescribes the manner in and extent to which livestock operations will be conducted in order to meet the multiple-use, sustained-yield, economic, and other needs and objectives as determined for the public land through land use planning; (2) describes the type, location, ownership, and general specifications for the rangeland improvements to be installed and maintained on the public land to meet the livestock grazing and other objectives of land management; and (3) contains such other provisions relating to livestock grazing and other objectives as may be prescribed by the authorized officer consistent with applicable law.

ALLUVIUM. Materials transported and redeposited by water. [2 groups: (1) Local alluvium, like that found at the base of slopes, along small streams flowing from small drainage basins of nearly homogenous rock and soil material, and (2) general alluvium of mixed origin, as along major stream courses.]

ANASAZI. The prehistoric culture located primarily in the plateau area of the Four Corners Region.

ANIMAL UNIT (AU). Considered to be one mature (1,000 lb.) cow or its equivalent based upon average daily forage consumption of approximately 2 percent of the total body weight of dry matter per day.

ANIMAL UNIT MONTH (AUM). The amount of food or forage required by an AU for one month.

ANNUAL. A plant which completes its life-cycle in one year and perpetuates itself solely by seed.

AQUIFER. A geologic formation, part of a formation, or a group of formations that contain sufficient saturated permeable material to yield significant quantities of water to wells and springs.

AREA OF CRITICAL ENVIRONMENTAL CONCERN (ACEC). Areas within public lands where special management attention is required to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources or other natural systems or processes, or to protect life and safety from natural hazards.

ASSOCIATION. A mapping unit used on generalized soil maps in which two or more defined taxonomic units occurring together in a characteristic pattern are combined.

BASALT. A hard, heavy, dark volcanic rock.

BEDROCK. The solid rock underlying the soil and other unconsolidated materials or appearing at the surface where these are absent.

BROWSE. (n) That part of leaf and twig growth of shrubs, woody vines, and trees available for animal consumption. (v) To consume.

CALCAREOUS. Containing sufficient free calcium carbonate or calcium-magnesium carbonate to effervesce visibly when treated with hydrochloric acid.

CALICHE. A layer near the surface, more or less cemented by secondary carbonates of calcium or magnesium precipitated from the soil solution. It may occur as a soft, thin soil horizon, as a hard, thick bed just beneath the solum, or as a surface layer exposed by erosion.

CARRION. The decaying flesh of a dead animal.

cfs. Cubic feet per second. A rate of discharge equivalent to 448.8 gallons per minute.

CLASS OF LIVESTOCK. Age and/or sex-group of a kind of livestock. For example: Cows with calves, yearlings, steers, ewes, ewes with lambs, etc.

CLAY. A mineral soil separate consisting of particles less than 0.002 mm in equivalent diameter.

CLIMAX. The plant community which will eventually arise and perpetuate itself on a range site under natural conditions.

COARSE FRAGMENTS. Rock or mineral particles 2.0 mm in diameter.

COBBLES. Rounded or partially rounded rock or mineral fragments between 3 and 10 inches in diameter.

COMPLEX (SOIL). A mapping unit in which two or more defined taxonomic units are so intimately intermixed geographically that it is undesirable or impractical, because of the scale being used, to separate them.

CONDITION CLASS. A quantitative comparison of a plant community with a hypothetical plant community which could arise in the same place under natural conditions.

CONTINUOUS GRAZING. The grazing of a specific unit by livestock throughout a year or for that part of the year during which grazing is feasible.

COVER. Small rocks, litter, basal areas of grass and forbs, and aerial coverage of shrubs that provide protection to the soil surface; i.e., in contrast to bare ground.

CULTURAL RESOURCE INVENTORY CLASSES.

Class I - existing data inventory: an inventory study of a defined area designed (1) to provide a narrative overview (cultural resource overview) derived from existing cultural resource information, and (2) to provide a compilation of existing cultural resource site record data on which to base the development of the BLM's site record system.

Class II - sampling field inventory: a sample-oriented field inventory designed to locate and record, from surface and exposed profile indications, all cultural resource sites within a portion of a defined area in a manner which will allow an objective estimate of the nature and distribution of cultural resources in the entire defined area. The Class II inventory is a tool to be utilized in management and planning activities as an accurate predictor of cultural resources in the area of consideration. The primary area of consideration for the implementation of a Class II inventory is a planning unit. The secondary area is a specific project in which an intensive field inventory (Class III) is not practical or not necessary.

Class III - intensive field inventory: an intensive field inventory designed to locate and record, from surface and exposed profile indications, all cultural resource sites within a specified area. Upon completion of such inventories in an area, no further cultural resource inventory work normally is needed. A Class III inventory is appropriate on small project areas, all areas to be disturbed, and primary cultural resource areas.

DIETARY OVERLAP. The percentage of identical diets of two different animals, or the percentage of a diet that is shared by two or more different animals; i.e., cattle and deer, cattle and antelope, etc.

DIRECT ECONOMIC IMPACT. Employment or income changes for individual economic sectors resulting from permitted grazing adjustment.

DISTRIBUTION OF LIVESTOCK. The arrangement of livestock, usually expressed by their grazing patterns, on a range.

DIVERSITY. The relative degree of abundance of wildlife species, plant species, communities, habitats, or habitat features per unit of area.

DIVIDE PLANNING AREA. The geographic area on which BLM planning documents have been written. This area consists of three planning units, which are the smallest sized planning area.

EMBAYMENTS. Term describing a continental border area that has sagged concurrently with deposition so that an unusually thick section of sediments results.

ENDANGERED SPECIES. Federally listed - Any species of animal or plant in danger of extinction throughout all or a significant portion of its range. New Mexico State (Group I) Species whose prospect of survival or recruitment in the State are in jeopardy in the foreseeable future. New Mexico State (Group II) - Species whose prospect of survival or recruitment within the State may become jeopardized in the foreseeable future.

ENVIRONMENTAL ASSESSMENT (EA). (A) A concise public document for which a Federal agency is responsible that serves to: (1) briefly provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact; (2) aid an agency's compliance with the National Environmental Protection Agency (NEPA) when no environmental impact statement is necessary; (3) facilitate preparation of a statement when one is necessary. (B) Includes brief discussions of the need for the proposal, of alternatives as required by Section 102(2)(E), of the environmental impacts of the Preferred and other Alternatives and a listing of agencies and persons consulted.

ENVIRONMENTAL IMPACT STATEMENT (EIS). A detailed written statement (document) required by Section 102(2)(C) of NEPA. This analytical document is developed for use by decisionmakers to weigh the environmental consequences of a potential decision. An EIS should accurately portray potential impacts on the human environment of a particular course of action and its possible alternatives.

EOLIAN. Pertaining to, caused by, or carried by the wind.

EPHEMERAL STREAM. Flows only in direct response to precipitation and the stream channel is, at all times, above the water table.

ERODIBILITY. Being susceptible to erosion. (Expressed by such terms as highly erodible, slightly erodible, etc.)

EROSION. The wearing away of the land surface by running water, wind, ice, or other geological agents including such processes as gravitational creep.

EXPERIMENTAL STEWARDSHIP PLAN. A program, authorized by the Public Rangeland Improvement Act (PRIA) of 1978, which provides incentives to or rewards for, holders of grazing permits and leases whose stewardship results in an improvement of the range condition of lands under permit or lease. This program explores innovative grazing management policies and systems which might provide incentives to improve range conditions.

FECAL ANALYSIS. A technique for determining diet by microscopic examination of fecal material.

FECAL COLIFORM. A bacteria found in the fecal material of all warm blooded animals.

FORAGE ALLOCATION. The amount of or percentage of the total forage produced, which is given for a particular use such as livestock grazing, wildlife, or watershed protection.

FORAGE SPECIES. Plants which are utilized as food by large herbivores, such as cattle, and by large and small wildlife.

FORB. A non-woody, non-grasslike herbaceous plant.

FUGITIVE DUST GENERATION. Dust due to wind.

GENERAL SOIL GROUP. A group of soils which are geographically associated, on similar landscapes, have similar geology, and generally have similar soil properties.

GEOLOGIC TIME SCALE. A chart that gives the era, period and epoch divisions of earth history. Comprised of, in part,: ERA - Cenozoic 65 million years (my)-present; Mesozoic 230-65my; and Paleozoic 600-230my. PERIODS - Tertiary 65-1my; Quaternary 1my-present; and Cretaceous 135-65my.

GRAZING ALLOTMENT. An area of land designated and managed for grazing of livestock.

GRAZING CAPACITY. The maximum livestock stocking rate possible without inducing damage to vegetation or related resources such as watershed. This incorporates such things as suitability of the rangeland to grazing as well as the proper use which can be made on all of the plants within the area. Normally expressed in terms of acres per AUM or sometimes referred to as the total AUMs that are available in any given area such as an allotment. Areas that are unsuitable for livestock use are not computed in the grazing capacity. Livestock grazing capacity may or may not be the same as the stocking rate.

GRAZING PREFERENCE. The total number of AUMs of livestock grazing on public land apportioned and attached to base property owned or controlled by a livestock operator.

HABITAT. An area where a plant or animal lives. (The sum total of environmental conditions of an area.)

HUMMOCK. A low mound or ridge of earth; knoll.

HYDROTHERMAL. An adjective applied to heat or hot aqueous, rich solutions and to the rocks, ore deposits, and alteration products produced by them.

IGNEOUS. Formed by solidification from a molten or partially molten state.

INCLUSIONS. Any soil or soil material that falls outside of the named phase or the range of the named series in the mapping unit.

INDUSTRIAL SECTORS. The division of the economy in areas such as the livestock industry, mining, etc.

INFILTRATION. The movement of water through the soil surface into the soil.

INFILTRATION RATE. Maximum rate at which the soil can absorb falling rain.

INFRASTRUCTURE. The basic framework or underlying foundation of a human community. It includes local organizations, institutions, services, systems, and facilities.

INPUT/OUTPUT MODEL. An economic model used to predict or stimulate the economy for the purpose of this study.

INSTANT STUDY AREA. One of the 55 primitive and natural areas formally identified by BLM through a final action published in the Federal Register before November 1, 1975. The Federal Land Policy and Management Act (FLPMA) requires an accelerated wilderness review of these areas.

KIND OF LIVESTOCK. Kinds of domestic livestock grazing on rangeland. Includes cattle, horses, sheep, goats, or a combination of these animals.

KIPUKA. An area surrounded by a lava flow. Hawaiian word for opening.

LEACHING. To extract from some material.

LIMESTONE. A sedimentary rock consisting chiefly (more than 50 percent) of calcium carbonate, primarily in the form of calcite.

LIVESTOCK ADJUSTMENTS (IN NUMBERS). A change (increase or decrease) of livestock numbers to conform to the amount of forage produced in an area considering other multiple uses.

LOAM. Soil material that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand.

LONG-TERM IMPACT. The future point in time when rangeland condition would have improved sufficiently to satisfy objectives. For analysis purposes in this EIS, the long term will consist of the time period through 2000.

MAPPING UNIT (SOILS). One or more soil series and inclusions used to describe a soil delineation; i.e., soil associations, consociations, and complexes.

MAPPING UNIT (VEGETATION). A discrete area having pre-defined characteristics different from adjoining areas.

MEAN. A quantity having a value intermediate between the values of other quantities represented. The number which is the average of the 14-year licensed use.

MEDIAN. The middle number in a given sequence of numbers.

MODE. The category, value, or interval of the variable having the greatest frequency. The number which has occurred most often in the 14-year licensed use.

MOGOLLON. The prehistoric culture located primarily in the Mogollon Mountain region of north-central Arizona and southwestern New Mexico.

MONOCULTURE. Of a single item or use. For example, in agriculture a monoculture would be growing some single crop and not using the land in any other way.

MULTIPLIER. The way in which an increase or decrease in new capital formation can cause cumulative effects in an economy through consumer expenditures.

NON-RANGE SITE. An area unsuitable for domestic livestock grazing because of adverse topographic conditions or features.

ORGANIC MATTER. Substances containing carbon in their chemical structure.

PARTICULATE MATTER. Matter formed of tiny separate particles.

PERENNIAL (Vegetation). A plant which has a life-cycle of 3 or more years.

PERENNIAL STREAM. Flows continuously year-round.

PERMEABILITY. The measure of the capacity for transmitting a fluid through the substance.

PETROCALCIC HORIZON. A continuous indurated calcic horizon that is cemented by calcium carbonates and, in some places, with magnesium carbonates. Cannot be penetrated with a spade; is impenetrable by roots.

pH. A measure of the acidity or alkalinity of a solution, numerically equal to 7 for neutral solutions, increasing with increasing alkalinity and decreasing with increasing acidity.

PHENOLOGICAL STUDIES. The studies of periodic biological phenomena such as initiation of growth, vegetative state, flowering, seeding, and dormancy, especially in relation to precipitation.

PHYSIOGRAPHIC PROVINCE. Region of similar structure and climate that has the same geologic history.

PLAYA. A nearly level area at the bottom of a basin, sometimes temporarily covered with water.

POTABLE WATER. Water fit for human consumption.

PRIMARY SUCCESSION. The natural replacement on previously unvegetated areas of plants by other plants better adapted to improving soil and moisture conditions until a plant community arises and can continuously perpetuate itself.

RANGE BETTERMENT FUND. The separate account in the National Treasury established by Section 40I(b)(I) of the Federal Land Policy and Management Act of 1976, consisting of 50 percentum of all monies received by the United States as fees for grazing livestock on public lands.

RANGE CONDITION (ECOLOGICAL). The present state of the vegetation on a range site in relation to the climax (natural potential) plant community for that site. It is an expression of the relative degree to which the kinds, proportions, and amounts of plants in a plant community resemble that of the climax plant community for the site. Range condition is esentially an ecological rating of the plant community. Four classes are used to express the degree to which the composition of the present plant community reflects that of the climax: Excellent (76-100); Good (51-75); Fair (50-26); and Poor (0-25). Also, see "Condition Class".

RANGELAND. Land on which the vegetation is predominantly grasses, grass-like plants, forbs, or shrubs usually suitable for grazing or browsing use.

RANGELAND CONDITION TREND. The direction of change in rangeland condition.

RANGELAND IMPROVEMENT. Any activity or program on or relating to rangelands which are designed to improve production of forage, change vegetative composition, control patterns of use, provide water, stabilize soil and water conditions, and provide habitat for livestock or wildlife.

RANGELAND MANAGEMENT. A distinct discipline founded on ecological principles and dealing with the husbandry of rangelands and range resources.

RANGELAND MANAGEMENT PROGRAM. Management of the rangeland resource as determined through development of BLM multiple land-use planning documents. During development of multiple land-use planning documents, BLM uses and observes the principles of: 1) multiple use, 2) sustained yield, 3) public participation, 4) intergovernmental cooperation, 5) a systematic interdisciplinary approach to achieve integrated consideration of physical, biological, sociological, economic and other sciences, 6) present and potential uses of public lands, 7) relative scarcity of values involved, 8) long-term benefits to the public versus short-term benefits, and 9) compliance with applicable Federal and State pollution control laws.

RANGELAND PROGRAM SUMMARY (RPS). A document to be issued subsequent to the finalization of this EIS. The RPS will reveal the BLM Socorro District Manager's final land use decision for the Range Management Program. Included in the document will be the consultation and decision schedule for each allotment.

RANGE SITE (SOILS). A grouping of soil types which will produce a potential vegetation community different from that produced by other soils groupings.

RANGE SITE (VEGETATION). A distinctive kind of rangeland that differs from other kinds of rangeland in its ability to produce a characteristic natural plant community. A range site is the product of all the environmental factors responsible for its development. It is capable of supporting a native plant community typified by an association of species that differs from that of other range sites in the kind or proportion of species or total production (SCS 1976).

RANGE SITE GUIDE TO SUGGESTED STOCKING RATES. A guide to indicate the approximate stocking rate and the variations that can be expected in favorable and unfavorable years for different range sites and range conditions within range sites.

RAPTOR. Any predatory bird (such as a falcon, hawk, owl, or eagle) that has feet with sharp talons or claws adapted for seizing prey and a hooked beak for tearing flesh.

REST ROTATION GRAZING SYSTEM. A grazing system providing for systematic and sequential grazing by livestock and resting from livestock use on a rangeland area to provide for the production of livestock while simultaneously maintaining or improving the vegetation and soil fertility.

RETROGRESSION. The process whereby the same area becomes successively occupied by different plant communities of lower ecological order.

RHIZOME. A root-like, usually horizontal stem growing under the ground, and sending out roots from its lower surface and leaves or shoots from its upper surface.

RIPARIAN HABITAT. Habitat typified by vegetation which occurs in or adjacent to drainage ways or their flood plains.

RUNOFF (Soils). A general term used to described the portion of precipitation on the land that ultimately reaches streams; may include channel and non-channel flow.

RUNOFF (Water Resources). That part of precipitation on a drainage area that is discharged from the area in stream channels.

RUSH. A grass-like plant in the genus Juncus.

SALTS. Chemical compounds formed by replacing all or part of the hydrogen ions of an acid with one or more cations (positive ions) of a base.

SAND. Individual rock or mineral fragments in a soil that range in diameter from 0.05 to 2.0 mm. Most sand grains consist of quartz, but they may be of any mineral composition. The textural class name of any soil that contains 85 percent or more sand and less than 10 percent clay.

SANDSTONE. A sedimentary rock containing predominately sand-sized clastic particles; usually consists of quartz more or less firmly united by some cement (as silica, iron oxide, or calcium carbonate) and that varies in color, being commonly red, yellow, brown, gray, or white.

SEASON-OF-USE. That season of the year in which a range is being grazed. It may be calender seasons or vegetation growth seasons.

SECONDARY SUCCESSION. A process similar to primary succession except that a climax community previously on the site has been destroyed by some disturbance. See "Primary Succession."

SECTION 3 PERMIT. A permit authorizing grazing use on public lands inside the District boundary. It is a reference to that section of the Taylor Grazing Act pertaining to land within the District boundary.

SECTION 15 PERMIT. A lease authorizing grazing use on public lands outside the District boundary. It is a reference to that section of the Taylor Grazing Act pertaining to land outside a District boundary but within its area of jurisdiction.

SEDGE. A grass-like plant in the genus Carex.

SEDIMENT. Solid, clastic material, both mineral and organic, that is in suspension, is being transported or has been moved from its site of origin by water, wind, or ice and has come to rest on earth's surface, either above or below sea level.

SEDIMENTARY ROCKS. Rocks formed by the accumulation of sediments in water (aqueous deposits) or from air (eolian deposits).

SHALE. A fissile rock that is formed by the consolidation of clay, mud, or silt, has a finely stratified or laminated structure, and is composed of minerals, essentially unaltered since deposition.

SHORT-TERM IMPACT.' The time period during which adjustments in permitted grazing levels on public land would be made. For analysis purposes in this EIS, the short term will consist of the time period through 1989.

SILT. Sedimentary material consisting primarily of mineral particles intermediate in size between sand and clay.

SITE WRITE-UP AREA (SWA). A map unit used in the Soil-Vegetation Inventory Method having a range site - vegetative aspect - condition class - combination which differs from adjoining map units.

SOCIAL CHANGE. The alteration in patterns of social structure, social institutions and social behavior over time.

SOCIAL ORGANIZATION. The process through which social relationships become recurrent, patterned, and orderly. The components of social organization are social roles and situations, social groups and organizations, and social institutions and society. All social organization is based in and originates from interaction.

SOIL. (1) The unconsolidated mineral material on immediate surface of the earth that serves as a natural medium for the growth of land plants. (2) The unconsolidated mineral matter of the surface of the earth that has been influenced by genetic and environmental factors including parent material, climate, topography, all acting over a period of time producing soil different from the parent material in physical, chemical, biological, and morphological properties and characteristics.

SOIL DEPTH. Very shallow (less than 12 inches); Shallow (12-20 inches); Moderately Deep (20-36 inches); Deep (36-40 inches); and Very Deep (more than 40 inches).

SOIL SERIES. A group of soils having genetic horizons that, except for texture of the surface layer, have similar characteristics and arrangement in the profile.

SOIL SURFACE FACTOR (SSF). The SSF, as computed through the use of BLM Form 7310-12, is an expression of current erosion activity. Seven categories of surface features are considered by soil scientists in the examination of the area represented by a transect. Both wind and water are considered for each category. The categories are: Soil movement, surface litter, surface rock, pedestalling, rills, flow patterns, and gullies. Numerical values are assigned to each category and are totalled to determine the SSF. The value of the SSF determines the erosion condition of the transect area. Also, see "Erosion Condition."

SOIL TEXTURE. The relative proportions of the various soil separates, sand, silt, and clay.

STOLON. A stem growing along the surface of the ground and taking root at the nodes or apex to form new plants.

SUBSOIL. Refers to the B horizon of soil with distinct profiles. In soils with weak profile development, subsoil can be defined as the soil below the surface soil in which roots normally grow or in terms of arbitrary depths.

SUBSTRATUM. Is on layer beneath the solum, either conforming (C) or unconforming (D).

SUCCESSIONAL STAGE. A vegetative community which is part of a progressive series leading to a community which perpetuates itself indefinitely under the environmental conditions.

SWALE. A range site occurring in a slightly depressed position which is level to moderately sloping and receives runoff from adjacent sites.

TEXTURE (SOILS). The relative proportions of various soil separates, sand, silt, and clay.

THREATENED SPECIES. Any species likely to become endangered within the foreseeable future throughout all or a significant part of its range.

TRANSECT. The area on which inventory data is gathered such as along a line, at points along a line, or over an area of a designated width and length.

TREND. A state of approaching ecological climax, regressing from climax, or remaining stable.

UTILIZATION. The proportion of any period's forage production that is consumed or destroyed by grazing animals, usually expressed as a percentage.

VEGETATION ASPECT. The kind of plant or plant species which is visually most prominent in an area.

VEGETATIVE LANO TREATMENTS. Methods used to control the growth and spread of undesirable vegetation or to increase the abundance of desirable vegetation. Control can be by chemical or mechanical means or by fire.

VEGETATIVE STRUCTURAL DIVERSITY. The diversity in an area that results from the complexity of the above ground structure of the vegetation.

VERY LARGE ARRAY (VLA). A radio astronomy observatory located on the San Augustine Plains. The VLA consists of a main headquarters complex, twenty-seven radio antenna dishes, and over twenty miles of rail track connecting the antenna bases. The VLA is the largest and most advanced device of its kind in the world.

VISITOR DAY. Participation in a recreation activity by one or more individuals aggregating a total of 12 hours use.

VISUAL RESOURCE. The land, water, vegetation, animal, aesthetic, or other features that are visible on all lands (scenic values).

VOLCANIC TUFF. Rock composed of compacted volcanic ash varying in size from fine sand to coarse gravel.

WILDERNESS STUDY AREA (WSA). A roadless area or island that has been inventoried and found to have wilderness characteristics as described in Section 603 of FLPMA and Section 2(c) of the Wilderness Act of 1964 (78 Stat. 891).

WIND ERODIBILITY GROUP (WEG). A group of soils having the same potential for soil blowing.

YEARLONG GRAZING. Continuous grazing for a calendar year.

YELLOWCAKE. Concentrated uranium (U308) ore after the milling process.

REFERENCES

Albuquerque Journal. 1979. November 4. p. F-2.

Arnold, J. F. 1950. Changes in Ponderosa Pine/Bunchgrass Ranges in Northern Arizona Resulting From Pine Regeneration and Grazing. J. Forestry 48:118-126.

Arnold, J. F., D. A. Jameson, and E. H. Reid. 1964. The Pinyon-Juniper Type of Arizona: Effects of Grazing, Fire, and Tree Control. USDA, Prod. Res. Rpt. 84. 28p.

Barnes, O. K. 1952. Pitting and Other Treatments on Native Range. Wyoming Ag. Exp. Sta. Bull. 318.

Barnes, O. K., D. Anderson, and A. Heerwagon. 1958. Pitting for Range Improvement in the Great Plains and the Southwest Desert Regions. USDA, Prod. Res. Rpt. 23.

Baur, J. R. 1978. Effects of Picloram and Tebuthiuron on Establishment of Ryegrass Winter Pasture. J. Range Mgt. 31(6): 450-455.

Beal, J. D. 1976. An Archaeological Survey of the Malpais Recreation Area. School of American Research, Santa Fe, NM. 41p.

Berman, M. J. 1979. Cultural Resources Overview: Socorro Area, New Mexico. FS-BLM. Santa Fe, NM. 128p.

Box, T. W. 1979. The American Rangelands: Their Condition and Policy Implications for Management. Proc. Rangeland Policies for the Future Symposium. January 28-31. Tucson, AZ.

Box, T. W., D. D. Dwyer, and F. H. Wagner. 1976. The Public Range and Its Management. Report to the President's Council on Environmental Quality.

Branson, F. A., R. F. Miller, and I. S. McQueen. 1966. Contour Furrowing, Pitting, and Ripping on Rangelands of the Western United States. J. Range Mgmt. 19(4):182-190.

Bussey, S. D. and P. H. Beckett. 1974. An Archaeological Survey of the National Radio Astronomy Observatory Very Large Array Project. NMSU. Las Cruces, NM. 40p.

Cable, D. R. and S. C. Martin. 1964. Forage Production and Stocking Rates on Southern Arizona Ranges Can Be Improved. USDA FS Research Note RM-30. CSU. Fort Collins, CO.

Canfield, R. H. 1939. Semi-Deferred Grazing as a Restorative Measure for Black Grama Ranges. Southwestern Forest and Range Exp. Sta. Res. Note No. 80. U.S. Government Printing Office. Washington, DC.

Clary, W. P. 1971. Effects of Utah Juniper Removal on Herbage Yields From Springerville Soils. J. Range Mgmt. 23(5):373-378.

Clayton, W. 1979. Personal Communication.

Cook, C. W. 1966. Development and Use of Foothill Ranges in Utah. Utah Agric. Exp. Sta. Bull. 461.

Council on Environmental Quality. 1978. Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act. 40 CFR, Parts 1500-1508.

Danson, E. B. 1957. An Archaeological Survey of West Central New Mexico and East Central Arizona. Papers of the Peabody Museum of Archaeology and Ethnology. 44(1). Harvard Univ. Press, Cambridge, MA. 133p.

Daubenmire, R. 1968. Ecology of Fire in Grasslands. In: Advances in Ecological Research 5:209-266.

Directory of New Mexico Agriculture. 1977. 42(4). Livestock Pub. Inc. Albuquerque, NM.

Dwyer, D. D. 1980. Evaluating Success of the Grazing System. Proc. Grazing Management Systems for Southwest Rangelands Symposium. April 1-2. Albuquerque, NM. The Range Improvement Task Force, NMSU, Las Cruces, NM.

Dwyer, D. D. and C. W. Gay, Jr. No date. Livestock Distribution. Its Importance in Good Range Management. NMSU Coop. Ex. Ser. Livestock Guide. No. 400B-802.

Environmental Improvement Division. 1977. Water Supply Regulations. 26p.

Eshelman, K. 1981. Range Management Program for the Divide Planning Area, New Mexico. USDI, BLM Socorro District Office Socorro, NM 25p.

Federal Land Bank Association of Albuquerque, NM. 1982. Personal Communication.

Findley, J. S., A. H. Harris, D. E. Wilson, and C. Jones. 1975. Mammals of New Mexico. University of New Mexico Press. 360p.

First New Mexico Corporation New Mexico Progress. 1980. Economic Report. Vol. 48. p. 14.

Foster, L. 1979. Grazing Systems - Their Effect on Cattle. In: Proc. for the Range Management Short Course. NMSU Coop. Ex. Ser. USDA-Lincoln National Forest. Lincoln National Forest Grazing Advisory Board.

Gaines, E. M., H. R. Kallander, and J. A. Wagner. 1958. Controlled Burning in Southwestern Ponderosa Pine: Results From the Blue Mountain Plots Fort Apache Indian Reservation. J. Forestry 56(5):323-327.

Gordon, E. D. 1978. Geology and Groundwater Resources of the Grants-Bluewater Area, Valencia County, New Mexico. USGS Tech. Rpt. 20. Santa Fe, NM. Reprint. 109p.

Gossett, B. and C. Gossett. 1982. Personal Communication. January.

Gray, J. R., R. R. Lansford, W. O. Gorman, and B. J. Creel. 1977. Socio-Economic Profile Analysis West-Central New Mexico. Final Report. Contract No. YA-S-12-CT 7-1, Pub. SW Res. and Dev. Co., Las Cruces, NM. 277p.

Hale, W. E., L. J. Reiland, and J. P. Beverage. 1965. Characteristics of the Water Supply In New Mexico. NM State Engineer Tech. Rpt. 31. Santa Fe, NM. 131p.

Hatch, C. F., A. B. Nelson, R. D. Pieper, and R. P. Kromann. 1968. Chemical Composition of Grasses at the Fort Stanton Experimental Range in South-Central New Mexico. NMSU. Ag. Exp. Sta. Rpt. 148. Las Cruces, NM. 11p.

Herbel, C. H. 1971. A Review of Research Related to Development of Grazing Systems on Native Ranges of the Western United States. USDA Agric. Res. Ser., Jornada Exp. Range Rpt. 3.

______. 1974. A Review of Research Related to Development of Grazing Systems on Native Ranges of the Western United States. In: Kreitlow, K. W. and R. H. Hart (eds.) Plant Morphogenesis as the Basis for Scientific Management of Range Resources. USDA Mis. Pub. 1271, pp. 138-149.

Herbel, C. H. and A. B. Nelson. 1966. Activities of Hereford and Santa Gertrudis Cattle on a Southern New Mexico Range. J. Range Mgmt., 19(4). July.

Herbel, C. H., R. Steger, and W. L. Gould. 1974. Managing Semi-Desert Ranges of the Southwest. NMSU, Coop. Ex. Ser. Cir. 456. Las Cruces, NM. 48p.

Hessary, I. K. and G. F. Gifford. 1979. Impact of Various Range Improvement Practices on Watershed Protective Cover and Annual Production Within the Colorado River Basin. J. Range Mgmt. 32(2):134-140.

Hewitt G. B., E. W. Huddleston, R. J. Lavigne, D. N. Ueckert and J. G. Watts. 1974. Rangeland Entemology. Society for Range Management. Range Science Series No. 2. pp. 33-34.

Holechek, J. L. 1981. Livestock Grazing Impacts on Public Lands: A View Point. J. Range Mgmt. 34(3):251-254.

Hopkins, H., F. W. Albertson, and A. Riegel. 1948. Some Effects of Burning Upon a Prairie in West-Central Kansas. Trans. Kansas Acad. of Sci. 51(1):131-141.

Hormay, A. L. 1956. How Livestock Grazing Habits and Growth Requirements of Range Plants Determine Sound Grazing Management. J. Range Mgmt. 9(4).

Hubbard, J. P. 1978. Revised Checklist of the Birds of New Mexico. NM Ornithological Soc. Pub. No. 6. 110p.

______. 1979. Personal Communication.

______. 1982. Personal Communication.

Hubbard, J. P., M. C. Conway, H. Campbell, G. Schmitt, and M. D. Hatch. 1979. Handbook of Species Endangered in New Mexico. N.M. Dept. Game and Fish, Dept. Nat. Res. Santa Fe, NM.

Huddleston, E. 1980. Personal Communication. Datil, NM. Meeting regarding white grub. July 8.

Humphrey, R. R. 1957. The Desert Grassland. A History of Vegetational Change and an Analysis of Causes. The University of Arizona Press.

______. 1962. Range Ecology. The Ronald Press Company. New York, NY.

Jameson, D. A. 1962. Effects of Burning on a Galleta-Black Grama Range Invaded by Juniper. Ecology 43(4):760-763.

Johnsen, T. N. and F. B. Gomm. 1981. Forage Plantings on Six Arizona Pinyon-Juniper Subtypes. J. Range Mgmt. 34(2):131-136.

Lacey, J. R. and H. W. Van Poollen. 1981. Comparison of Herbage Production on Moderately Grazed and Ungrazed Western Ranges. J. Range Mgmt. 34(3):210-212.

Lynott, W. P. 1978. Climate and Dispersion Meteorology of BLM Lands In New Mexico. Science Applications, Inc. La Jolla, CA. 340p.

Marshall, M. P. 1976. Summary of Known Cultural Resources in the Socorro Bureau of Land Management District. Unpublished report prepared under contract to BLM by the School of Amercian Research. Santa Fe, NM.

Martin, S. C. 1975. Ecology and Management of Southwestern Semi-Desert Grass/Shrub Ranges: The Status of Our Knowledge. USDA FS. Rocky Mountain Forest and Range Exp. Sta. Fort Collins, CO.

______. 1978. Grazing Systems - What Can They Accomplish? Rangeman's Journal 5(1):14-16.

Monson, G. and W. Kessler. 1940. Life History Notes on the Banner-Tailed Kangaroo Rat, Merriam's Kangaroo Rat, and the White-Throated Woodrat in Arizona and New Mexico. J. Wild. Mgmt. 4(1):37-43.

National Research Council. 1968. Principles of Plant and Animal Pest Control. II. Weed Control. National Academy of Sciences Pub. No. 1597.

Nelson, A. B., C. F. Hatch, R. D. Pieper, and R. P. Kromann. 1968. Chemical Composition of Grasses at the Fort Stanton Experimental Range in South-Central New Mexico. NMSU. Agric. Exp. Sta. Rpt. 148.

New Mexico Department of Education. Evaluation Assessment Testing Unit. New Mexico School District Profile 1978-1979 School Year. Santa Fe, NM.

______. New Mexico School District Profile, 1978-1979 School Year. Santa Fe, NM.

New Mexico Department of Finance and Administrations. Automated Data Processing Division. 1981. Estimated Populations of Cibola and Valencia Counties. March 24. 1p.

New Mexico Department of Game and Fish. 1978. Comprehensive Plan: Part II. Santa Fe, NM.

New Mexico Department of Human Services. Income Support Division. Fiscal Statistical Section. Ann. Stat. Rpt. Fiscal Year 1979-1980. Santa Fe, NM. pp. 3, 4, 14.

New Mexico Employment Security Department. Employment Services Division. Research and Statistics. 1982. January. Personal Communication. December 1981 Preliminary Data. Albuquerque, NM.

New Mexico Employment Security Department. Research and Statistics. 1981. New Mexico Labor Market Informations Review. September. 31p.

New Mexico Health and Environment Department. Health Services Division. Vital Statistics Bureau. 1979. New Mexico Selected Health Statistics. Ann. Rpt. Santa Fe, NM. pp. 15-16

New Mexico State Game Commission. 1979. Protection of Endangered Species and Subspecies of New Mexico. N.M. Dept. Game and Fish. Reg. No. 599. Santa Fe, NM.

New Mexico State Police. Uniform Crime Reports. 1979. New Mexico Crime Reports. Santa Fe, NM. pp. 34-42.

New Mexico Stockman. 1977. 42(4). March. Albuquerque, NM.

New Mexico Transportation Department. Motor Vehicle Division. 1980. Mobil Homes. Santa Fe, NM.

New Mexico Water Quality Control Commission. 1974. Lower Colorado River Basin Plan. Santa Fe, NM. 138p.

______. 1974. Western Closed Basin Plan. Santa Fe, NM. 28p.

______. 1976. Middle Rio Grande Basin Plan. Santa Fe, NM. 148p.

______. 1981. Water Quality Standards for Interstate and Intrastate Streams in New Mexico. Santa Fe, NM. 40p.

Odum, E. 1971. Fundamentals of Ecology. W. B. Saunders Company. Philadelphia, PA. 574p.

O'Rourke, J. T. and P. R. Ogden. 1970. Pinyon-Juniper Control: Where, Why? Prog. Agric. in Arizona. 22(6):12-15.

Pacific Southwest Inter-Agency Committee (PSIAC). 1968. Report on Factors Affecting Sediment Yield in the Pacific Southwest Area and Selection and Evaluation of Measures for Reduction of Erosion and Sediment Yield.

Paulsen, H. A. Jr. and F. N. Ares. 1962. Grazing Values and Management of Black Grama and Tobosa Grasslands and Associated Shrub Ranges of the Southwest. USDA FS Tech. Bull. No. 1270. U.S. Government Printing Office. Washington, DC.

Pendleton, O. T. 1979. Proc. Rangeland Policies for the Future Symposium. January 28-31. Tucson, AZ.

Pettit, R. D. 1979. Effects of Picloram and Tebuthiuron Pellets on Sand Shinnery Oak Communities. J. Range Mgmt. 32(3):196-200.

Pieper, R. D. 1970. Species Utilization and Botanical Composition of Cattle Diets on Pinyon-Juniper Grassland. NMSU Agric. Exp. Sta., Bull. 566. In: Effects of Livestock Grazing on Other Resources. 1977. Technology Application Center, UNM. BLM Contract: RFP-YA-512-RFP7-33. Albuquerque, NM. pp. II-293 - II-308.

______. 1979. What Typifies Good and Improving Versus Declining Range. In: Proc. for the Range Management Short Course. NMSU Coop. Ext. Ser. USDA-Lincoln National Forest, Lincoln National Forest Grazing Advisory Board.

______. 1980. Impacts of Grazing Systems on Livestock. Proc. Grazing Management Systems for Southwest Rangelands Symposium. April 1-2. Albuquerque, NM. The Range Improvement Task Force, NMSU, Las Cruces, NM.

Pieper, R. D. and G. B. Donart. 1979. Drought Effects on Southwestern Range Vegetation. In: Proc. for the Range Management Short Course. NMSU. Coop. Ext. Serv. USDA-Lincoln National Forest, Lincoln National Forest Grazing Advisory Board.

Plummer, A. P., A. C. Hull, Jr., G. Stewart, and J. H. Robertson. 1955. Seeding Rangelands in Utah, Nevada, Southern Idaho, and Western Wyoming. USDA Agric. Handbook 71.

Plummer, A. P., O. R. Christensen, R. Stevens, and N. V. Hancock. 1970. Improvement of Forage and Habitat for Game. Ann. Conf. of Western Assoc. of State Game and Fish Commissioners. July 15.

Potter, L. D. and J. C. Krenetsky. 1967. Plant Succession With Released Grazing on New Mexico Rangelands. J. Range Mgmt. 20(3):272-278.

Price, A. 1982. Personal Communication.

Ragsdale, B. J., G. O. Hoffman, and J. D. Rodgers. 1979. Grazing Systems for Profitable Ranching. In: Proc. for the Range Management Short Course. NMSU Coop. Ext. Serv. USDA - Lincoln National Forest, Lincoln National Forest Grazing Advisory Board.

Rechenthin, C. A., H. M. Bell, R. V. Pederson, and D. B. Polk. 1964. Grassland Restoration. II. Brush Control. USDA-SCS. Temple, TX.

Richard, C. 1981. Personal Communication. December.

Sauerwein, W. J. 1981. Pinyon-Juniper Management. USDA-SCS. Woodland Tech. Note 13. Portland, OR. 20p.

Schickedanz, J. G. 1980. Summary Statement Presented by The Range Improvement Task Force. In: J.M. Fowler (ed.). Hearing on Livestock Grazing on Public Lands - Senator Pete V. Domenici, Chairman. NMSU Coop. Ext. Ser. Rpt. 3, Las Cruces, NM. 14p.

Smith, E. L. 1980. Constraints to Improved Management of Public Rangeland. A Panel Discussion Presented by the Range Ecology Working Group. Society of American Foresters. 4p.

Snow, C. 1972. Habitat Management Series for Endangered Species. Black-Footed Ferret (Mustela nigripes). USDI, BLM. Rep. No. 2. 23p.

______. 1973. Habitat Management Series for Endangered Species. Bald Eagle (Haliaeetus leucocephalus). USDI, BLM. Rep. No. 5. 58p.

Society for Range Management. 1974. A Glossary of Terms Used in Range Management. Range Term Glossary Committee. 2nd Ed. Denver, CO. 36p.

Sosebee, R. E., W. E. Boyd, and C. S. Brumley. 1979. Broom Snakeweed Control with Tebuthiuron. J. Range Mgmt. 32(3):179-182.

Spiegel, Z. 1955. Geology and Groundwater Resources of Northeastern Socorro County, New Mexico. State Bureau of Mines and Mineral Resources. Groundwater Rpt. 4. 99p.

Springer, M. D., J. C. Truet, M. A. Candeleria, and K. Stinnett. 1980. Inventory of Terrestrial and Aquatic Wildlife Species, Socorro BLM District. LGL Ecological Research Associates Inc. Unpub. Rpt. 1981. Bryon, TX. 300p.

Stoddart, L. A., A. D. Smith, and T. W. Box. 1975. Range Management. McGraw-Hill Book Co. New York, NY. 532p.

Tainter, J. A. and D. A. Gillio. 1980. Cultural Resources Overview: Mount Taylor Area, New Mexicn. FS-BLM. Santa Fe, NM. 199p.

Tainter, J. A. and F. Levine. 1981. Cultural Resources Overview: Central New Mexico. MS on file with Cibola National Forest Office. Albuquerque, NM.

Titus, F. B., Jr. 1963. Geology and Groundwater Conditions in Eastern Valencia County, New Mexico. State Bureau of Mines and Mineral Resources. Groundwater Rpt. 7. 113p.

Tuan, Yi-Fu, A. E. Everand, J. G. Widdison, and I. Bennett. 1973. The Climate of New Mexico. State Planning Office. Rev. Ed. Santa Fe, NM. 197p.

U.S. Army Corps of Engineers. Albuquerque District. 1979. Rio Grande Basin, New Mexico, Rio Puerco and Rio Salado Watersheds. Design Memo. No. 1. Albuquerque, NM. 76p.

U.S. Department of Agriculture. Soil Conservation Service. 1973. Peak Rates of Discharge for Small Watersheds, Chapter 2. Engineering Field Manual for Conservation Practices. Albuquerque, NM. 32p.

______. Soil Conservation Service. 1976. National Range Handbook.

______. Soil Conservation Service. 1977, 1978, 1980, and 1981. Range Site Descriptions. Tech. Guides. Sec. 11 E.

______. Soil Conservation Service. 1980. Major Land Resource Areas. Tech. Guides Sec. IB.

U.S. Department of Commerce. Bureau of the Census. 1970. General Population Characteristics. PC(1)-B33, NM. pp. 33, 35, 63, 64, 70, 71.

______. Bureau of the Census. 1970. General Social and Economic Characteristics. PC(1)-C33, NM. 49p.

______. Bureau of the Census. 1971. 1970 Census of Population - General Social and Econnmic Characteristics, New Mexico. December. Washington, DC. pp. 200-202.

______. Bureau of the Census. 1972. County and City Data Book. 1972. A statistical Abstract Supplement. Social and Economic Statistics Administration. Washington, DC. 321p.

______. Bureau of the Census. 1977. Social Indicators, 1976. Washington, DC.

______. Bureau of the Census. 1980. 1980 Census of Population and Housing. Data from Unpublished report produced by UNM.

______. Bureau of the Census. 1981. 1980 Census of Population and Housing, NM. Adv. Rpt. PHC 80-V-33, March. pp. 4, 6-7.

______. National Oceanngraphic and Atmospheric Administration. Environmental Data Service. Climatological Data. New Mexico Annual Summaries 1960-1980. Asheville, NC. 263p.

______. National Oceanographic and Atmospheric Administration. Weather Bureau. Climatic Summaries of the United States - New Mexico Supplements for 1931-1960. Washington, DC. 182p.

U.S. Department of the Interior. Bureau of Land Management. 1979. East Socorro Grazing Environmental Statement. Water Resources Section. BLM Socorro District Office, Socorro, NM. 423p.

______. Bureau of Land Management. 1979. Interim Management Policy and Guidelines for Lands Under Wilderness Review. Washington, DC. 32p.

______. Bureau of Land Management. 1980. Areas of Critical Environmental Concern: Policy and Procedures Guidelines. U.S. Government Printing Office. Washington, DC.

______. Bureau of Land Management. 1980. New Mexico Wilderness Study Area Decisions. New Mexico State Office. Santa Fe, NM. pp. 54-86.

______. Bureau of Land Management. 1981. Wilderness Management Policy. Federal Register 46(185):47181-47205.

______. Bureau of Land Management. 1981. Divide Planning Area Unit Resource Analysis. BLM Socorro District Office. March.

______. Bureau of Land Management. 1981. Divide Planning Area Planning Area Analysis. BLM Socorro District Office. May.

______. Bureau of Land Management. 1981. Divide Planning Area Management Framework Plan (through Step 2). BLM Socorro District Office. Sept.

______. Bureau of Reclamation. 1976. New Mexico Water Resources Assessment for Planning Purposes. Santa Fe, NM. 218p.

______. Fish and Wildlife Service. 1980. Endangered and Threatened Wildlife and Plants: Review of Plant Taxa for Listing as Endangered or Threatened Species. Federal Register. 45(242). 89p.

______. Fish and Wildlife Service 1980. Republication of Lists of Endangered and Threatened Species. Federal Register. 45(99):33767-33781.

______. Geological Survey. 1979. Water Data Report NM-79-1. 747p.

University of New Mexico. Bureau of Business and Economic Research. 1979. Population Estimates and Projections: 1970-2000. Counties and Wastewater Facility Planning Areas. September. Albuquerque, NM. pp. 48, 50.

______. Bureau of Business and Economic Research. 1979-80. New Mexico Statistical Abstract. Biennial Ed. Albuquerque, NM. pp. 75, 101, 105, 158, 164, 216, 224.

______. Health Sciences Center. New Mexico Health Resources Registry - 1977. North Campus. Albuquerque, NM. pp. 12, 30, 33.

Vallentine, J. F. 1971. Range Development and Improvements. Brigham Young University Press. Provo, UT. 516p.

Van Poollen, H. W. and J. R. Lacey. 1979. Herbage Response to Grazing Systems and Stocking Intensities. J. Range Mgmt. 32(4):250-253.

Vogt, E. A. 1955. Modern Homesteaders: The Life of a Twentieth-Century Frontier Community. The Balknap Press of Harvard University Press. Cambridge, MA. 232p.

Vogt. E. A. and E. M. Albert. 1967. People of Rimrock: A Study of Values in Five Cultures. Harvard University Press. Cambridge, MA. 342p.

Wallmo, O. C. 1978. Mule and Black-Tailed Deer - Big Game of North America. Stackpole Books. Harrisburg, PA. pp. 31-41.

Weber, R. 1981. Personal Communication. June.

Webster's Third New International Dictionary of the English Language. 1976. G. and C. Merriam Co. Springfield, MA. 2662p.

Wiens, J. A. and M. I. Dyer. 1975. Rangeland Avifaunas: Their Composition, Energetics, and Role in the Ecosystem. Symposium on Management of Forest and Range Habitat for Nongame Birds. May 6-9. Tucson, AZ.

Willard, E. E. and J. L. Schuster. 1971. An Evaluation of an Interseeded Sideoats Grama Stand Four Years After Establishment. J. Range Mgmt. 24(3):223-226.

Wiseman, R. N. 1974. The Malpais Reconnaissance: An Archaeological Inventory and Evaluation of Some Prehistoric Sites in the El Malpais Planning Unit. BLM Socorro District Contract Report. 37p.

Wood, J. 1980. Personal Communication. February and March.

Wood, J. E. 1969. Rodent Populations and Their Impacts on Desert Rangeland. NMSU Agric. Exp. Sta. Bull. 555, Las Cruces, NM. 17p.

Wright, H. A. 1971. Why Squirreltail is More Tolerant to Burning Than Needle-and-Thread. J. Range Mgmt. 24(4):277-284.

Wright, H. A., L. F. Neuenschwander, and C. M. Britton. 1979. The Role and Use of Fire in Sagebrush-Grass and Pinyon-Juniper Plant Communities. A State-of-the-Art Review. USDA FS Gen. Tech. Rpt. INT-58. Intermountain Forest and Range Exp. Sta. 49p.

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FROM:

Name ________________________________

Representing ________________________________

Mailing Address ________________________________

City/State ________________________ Zip Code ________

I wish to appear at the following public hearing(s) to express my views: (Check one)

______ 7 p.m., June 8, 1982, Community Room, Grants State Bank, Grants, New Mexico.

______ 7 p.m., June 9, 1982, Community Hall, Datil, New Mexico.

______ I intend to submit written documentation.

____
Signature

Verbal testimony will be limited to 10 minutes; written comments will be accepted until 4:30 p.m. on July 9, 1982, or at any of the public hearings.

Please return this form by June 4, 1982. No postage is required; simply fold the form, staple or tape it closed and drop it in any mailbox.

Divide Planning Area Boundary
Grazing Allotment Boundary
0033 Allotment Number
Surface Ownership Legend
🟨 PUBLIC LANDS
🟩 NATIONAL FOREST
🟦 STATE LANDS
⬜ PRIVATE LANDS
SCALE: 1/4" = 1 Mile
MAP AREA
NEW MEXICO
COLORADO
OKLA
ARIZONA
TEXAS
MEXICO
Cibola Co.
Catron Co.
Socorro Co.
Cibola Co.
Valencia Co.
Valencia Co.
MATCH LINE (SEE INSET)
MATCH LINE

Management Category by Allotment

Allot. No.	Allotment Name	Mgt. Cat.
0001	TWIN PEAKS	B
0002	DUALLS	F
0003	DUALLS	B
0004	CRISWELL	F
0005	HORSE SPRINGS	B
0006	CRISWELL	F
0007	McBROOM	E
0008	LAPP RANCH	B
0009	SULLIVAN	B
0010	KELLOGG CANYON	B
0011	ORONA COMMUNITY	B
0012	KELLOGG CANYON	B
0013	STOCK DRIVEWAY	B
0014	HALF CIRCLE D	F
0015	UPPER PATTERSON CANYON	F
0017	PATTERSON CANYON	B
0018	TEJANA MESA	B
0019	SALT LAKE EAST	F
0020	WILBUR WADLEY DRAW	F
0021	SAN IGNACIO CREEK	B
0022	AUGUSTINE	B
0023	BOX LAKE	E
0024	COYOTE CANYON	D
0025	COW SPRINGS	B
0026	MARINE WHITE LAKE	B
0027	BARNETT	F
0028	Y RANCH	E
0029	CROSSLINE	B
0030	BUTLER	B
0031	ARROYO BACA	B
0032	ADOBE	B
0033	CASTILLO MANGAS	F
0034	F E CHAVES	E
0035	MESA RANCH	D
0036	SALT LAKE WEST	F
0037	WILBUR WADLEY DRAW	B
0038	RED HILL SOUTH	E
0039	PEDRO A CHAVES EST	F
0040	COYOTE CANYON	O
0041	RICHARD M CHAVEZ	F
0042	RITO CREEK	F
0043	ZUNI PLATEAU	O
0044	GOAT RANCH	O
0045	DAVILA SALT LAKE NORTH	F
0046	CAT MOUNTAIN	E
0047	DURFEE	E
0048	CURTIS RANCH	B
0049	BACA SPRING	F
0050	EAGAR RED HILL	E
0051	EMERY	B
0053	LYNCH RANCH	D
0054	SHAW CANYON	B
0055	KIEHNE PLACE	B
0056	HO	O
0057	CARRIZO CREEK N	D
0058	MARINE WHITE LAKE	B
0059	ADOBE	B
0060	LEANDRO WELL	B
0061	MARIANO HILL	F
0062	RED HILL NORTH	F
0063	ANDERSON PEAK	B
0064	EVANS WELL	B
0065	ZUNI PLATEAU	D
0066	WHITEWATER CANYON	B
0067	EAST RITO CREEK	F
0068	PANTHER CANYON	B
0069	CERRO PRIETO	B
0070	RANCHO ALEGRE	E
0071	NORTH FORK ALAMOCITO	B
0072	MANGAS RANCH	E
0073	HEAVENLY ACRES	B
0074	CROSBY CANYON	F
0075	DAVILA SALT LAKE SOUTH	F
0076	YORK RANCH	O
0077	EMERY	F
0078	PATTERSON	B
0079	STOKES FLAT	O
0080	LE SUEUR	F
0081	LYNCH RANCH	O
0082	C N	B
0083	CAT MOUNTAIN	B
0084	PAUL LUND	B
0085	PATTERSON CANYON	F
0086	CAT MOUNTAIN	B
0087	MERTZ	E
0088	MARIANO MESA	B
0089	LEANDRO WELL	B
0090	PANTHER CANYON	B
0091	CERRO PRIETO	F
0092	AGUA FRIA	E
0093	TRES MONTOSA	B
0094	ESCONDIDO CREEK	B
0095	DATIL AIRSTRIP	F
0096	MAYES WASH	O
0097	TANQUE DE CABALLOS	F
0098	ARROYO BACA	D
0099	F ORONA	B
0100	GATLIN LAKE	F
0101	CHIHUAHUA LAKE	B
0102	ORONA LARGO CREEK	B
0103	LOPEZ DRAW	F
0104	PUEBLITO RANCH	F
0105	NORTH FORK ALAMOCITO	F
0106	RANEY	B
0107	SUMMERS COMMUNITY	B
0108	RENOLDS	B
0109	PATTYS HOLE	B
0110	W HORSE MOUNTAIN	B
0111	E HORSE MOUNTAIN	B
0112	HERMAN SANCHEZ	B
0113	CROSBY CANYON	F
0114	DATIL AIRSTRIP	F
0115	MCBROOM	E
0116	SPRING CANYON RANCH	B
0117	N FOX MOUNTAIN	F
0118	ALAMITO RANCH	F
0119	SPEARS HOME	B
0120	SPEARS HOME	F
0121	ORONA LARGO CREEK	B
0123	GOAT TANK CANYON	F
0124	HALE WELL	F
0125	N HORSE MOUNTAIN	F
0126	LIMESTONE CANYON	B
0127	FOX MOUNTAIN	F
0128	WILLIAMS HOME	F
0130	POVERTY CREEK RANCH	F
0132	W RANCH	F
0133	TRES LAGUNAS	O
0135	BILL G & W F GREEN	B
0136	SILVER CREEK	B
0137	PIETOWN DIKE	F
0138	IRON MOUNTAIN	F
0139	PIETOWN TRACT 15	F
0140	LEHEW	F
0141	SAWTOOTH MOUNTAIN	F
0142	OAK SPRINGS	F
0143	N HORSE MOUNTAIN	F
0144	NM AZ STATE LINE	F
0145	HALE WELL	B
0146	MONTICELLO CANYON	F
0147	KINSELY CANYON	F
0148	WAHOO RANCH	E
0149	WILLIAMSON	B
0150	CAT LAKE	B
0151	MONTOYA	B
0152	WHITEWATER CANYON	B
0153	E SLADE	F
0154	ACOMA PUEBLO	O
0155	ARROSA	F
0156	PETE BACA JR	D
0157	LEWIS BRIGHT	F
0158	VENTANA RIDGE	F
0159	CERRO CHATO	D
0160	LOS CERROS	O
0161	CERRO BRILLANTE	D
0162	M J PORTER	F
0163	A MIRABAL	B
0164	LEW DANIELS	F
0165	AUGUSTINE	B
0166	OLGUIN DRAW	F
0167	OLGUIN DRAW HO	F
0168	TARPLEY WELL	F
0169	EV	B
0170	TA	F
0171	JB	O
0172	DB	B
0173	EC	F
0174	AA	B
0175	ER	F
0176	GR	B
0177	HP	F
0178	HL	F
0179	MB	F
0180	BS	O
0181	CM	B
0182	VM	F
0183	FP	B
0184	EJ	F
0185	P&S	F
0186	MR	F
0187	BR	F
0188	MB	D
0189	WO	F
0190	W CROCKETT	B
0192	W EMERY	F
0193	V S TIETJEN	F
0194	HQ WELL	B

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VISUAL A

Surface Ownership of the Divide Planning Area, Grazing Allotments, and Management Category by Allotment

Source: BLM Socorro District Planning / EIS Files

SCALE: 1/4" = 1 Mile
MAP AREA
COLORADO
OKLA
ARIZONA
NEW MEXICO
TEXAS
MEXICO
N
Cibola Co.
Valencia Co.
Cibola Co.
Catron Co.
orro Co.
Valencia Co.
MATCH LINE (SEE INSET)
MATCH LINE

Ecological Range Condition
Legend

- 🟩 EXCELLENT
- 🟩 GOOD
- 🟩 FAIR
- 🟩 POOR
- 🟩 NON-RANGE SITE

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VISUAL B

SIDE 1

Ecological Range Condition
Within the Divide Planning Area

Source: BLM Socorro District Planning / EIS Files

SCALE: 1/4" = 1 Mile
Cibola Co.
Catron Co.
Socorro Co.
Cibola Co.
Valencia Co.
MATCH LINE (SEE INSET)
MATCH LINE
Valencia Co.
CEBOLLETA GRANT
N
MAP AREA
COLORADO
OKLA
ARIZONA
NEW MEXICO
TEXAS
MEXICO

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WEST SOCORRO RANGELAND MANAGEMENT PROGRAM
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VISUAL B

SIDE 2

Range Sites
Within the Divide Planning Area

Source: BLM Socorro District Planning / EIS Files

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